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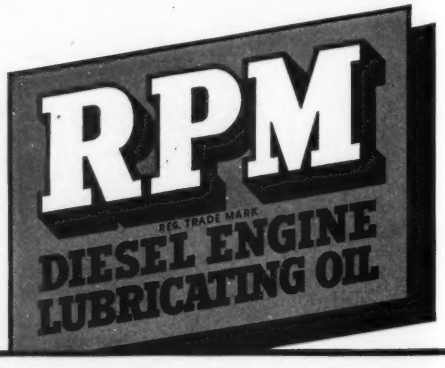

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Seismograph Prospecting For Oil

Symposium—Parts 1, 2 and 3

By WALTER A. ENGLISH

The four papers making up this symposium have been prepared especially for those who have no knowledge of seismograph prospecting. To many people mathematics is a formidable subject, and many are discouraged from studying seismograph prospecting under the mistaken assumption that the mathematical requirements are severe. In the papers presented here there is not a single mathematical equation. We believe that considerable competence in dealing with some of the most important problems of this work can be attained without any mathematical training whatever. At the present time, there is a real need for interpretation of results by persons thoroughly competent to bring geologic experience and imagination to bear on data that are subject to multiple interpretation from a strictly physical viewpoint.

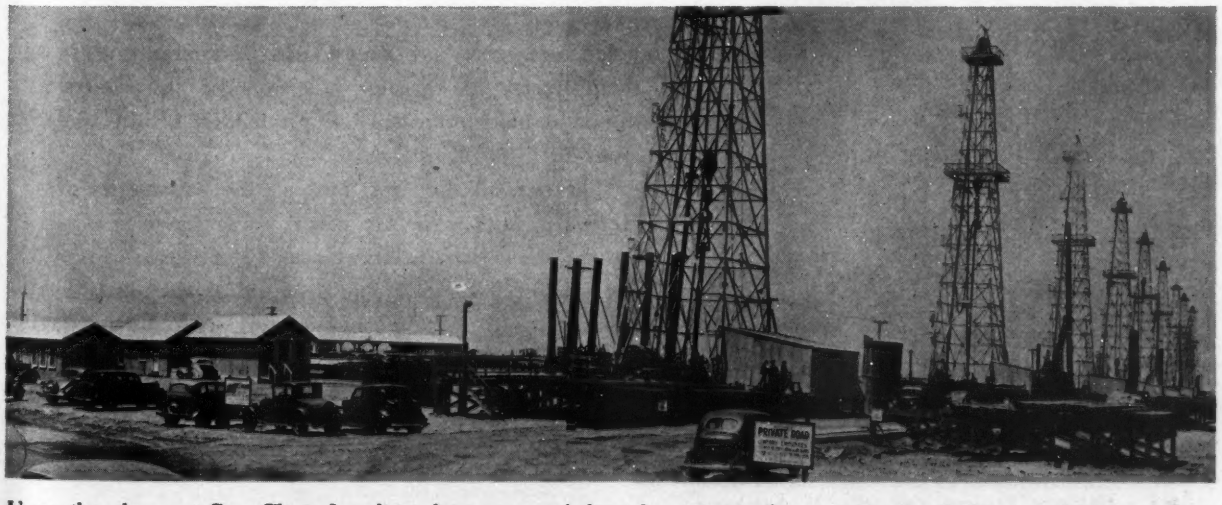
Likewise, those charged with the responsibility of planning seismograph exploration campaigns would do well to become familiar with as much as possible of the technical aspects of the work. They would then be in better position to judge of its success in individual cases. It has often been said that the seismograph is a new structure-finding tool for the geologists to use. Using a tool and using its product are two different things. One does not use an automatic screw-threading machine when one buys a box of screws at the hardware store. Neither does the geologist use the seismograph as a tool when his interest is confined to checking up on the cost per spread, and counting the number of closing contours of the structure shown on the final map presented to him.

Much of the territory in the United States suitable to seismograph work has already been shot over in more or less detail. To be successful in the future it will be necessary to find favorable structures that have been overlooked. Improvements in instruments and field methods will be factors, but one must be able to distinguish between real improvements and nonessential talking points or misleading instrumental modification of the vibrations returned by the earth. Possibly the largest factor will be the ability to recognize obscure leads where the best instruments and methods do not produce clearcut results. The geologist has become accustomed to recommending drilling of structures that appear doubtful on the basis of surface mapping. He will have to do the same thing for structures found by the seismograph. Each organization would do well to develop somewhere within itself the ability to judge accurately of the real merit of seismograph results, which may give an obscure clew to a new oil field or which may be only misinterpretation of poor or misleading records.

While written for the American Institute of Mining and Metallurgical Engineers, this symposium on the art of seismographic exploration of underground structures is the first comprehensive exposition on the subject which is entirely free of mathematical formulas.

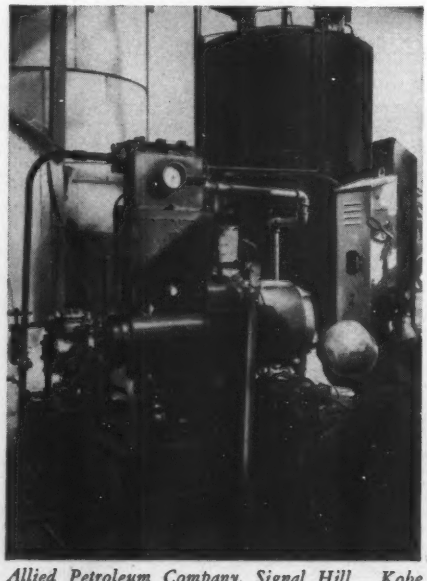
Mssrs. Walter A. English, Willard H. Tracy, Arthur Nomann, Frank Ittner and P. C. Kelly, members of the A.I.M.E., are to be congratulated upon their understanding of the questions which fill the minds of the uninitiated.

This symposium will be concluded in the First Issue July Number of the California Oil World.



Along the shore at Sta. Clara Landing, long rows of derricks attest to the activity of a drilling combination representing Hancock, Signal, Standard, Apex, Macrate, and Termo.

ELECTRICITY AT WORK IN THE OIL FIELDS



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Theory of Seismic Reflection Prospecting

By WILLARD H. TRACY

The method of seismic reflection prospecting has many times been compared to sound ranging, a process that became familiar to many during the World War. According to this very simple theory, the dynamite goes off and sends out a compression wave, which meets a reflecting horizon and returns to the surface, where it is recorded and the elapsed time of its travel in the earth accurately determined. Computations are then made on the general theory that the longer the elapsed time, the greater the depth of the reflecting bed. While this serves to give an idea of the fundamental basis of the process, it suggests a simplicity that does not exist in the life history of the various waves set up by a dynamite explosion in the earth.

To begin with, a seismic wave in the earth does not obey the same simple laws of propagation that apply to a sound wave in the air. The property of strength in shear possessed by solids introduces a factor that sets such waves apart from the ordinary air waves. Also, the transmission characteristics of the earth vary widely from place to place, and a fairly accurate knowledge of the space relationships of these variations is necessary if the final results are to be understood. Besides the waves recorded and used in the reflection computations, there are many unwanted waves resulting from the explosion and we must know something of these in order not to confuse them with the wanted reflections.

Though we wish to know something of the theory of seismic waves, as a matter of fact the methods of reflection prospecting have been built up empirically by trial and error, with very little real aid furnished by the theoretical physicists and mathematicians. Not only is the present successful process not the result of following out the obvious conclusions to be drawn from a simple theory, but there are few that will undertake to fully explain the reasons for its success. In areas where the present best practice does not give entirely satisfactory results, the lack of complete knowledge of the various wave paths, and changes in wave character, and the energy relations of the different waves, make it difficult to search for improved methods except by the same old cut and try process. It is only as we do many things according to the methods dictated by hard-won experience that the seismograph record shows any waves that fit into our scheme of reflection calculations. While we have a simple theory to account for the presence of usable reflections on a good record, we are unable to give a clear description of the wave paths and character of waves that produce the bad record that is commonly marked "no reflections" and discarded. We do know that there are many wave paths besides those of the wanted reflections, and that some of these unwanted waves carry considerably more energy than the wanted ones. The chief difficulty of seismic prospecting is, then, the problem of successfully recording the wanted waves and as far as possible excluding the unwanted waves. It is for this reason that a complete knowledge of waves generated by a dynamite explosion would be valuable, and that all those engaged in seismic prospecting should have at least some knowledge of the character of both wanted and unwanted waves.

Waves

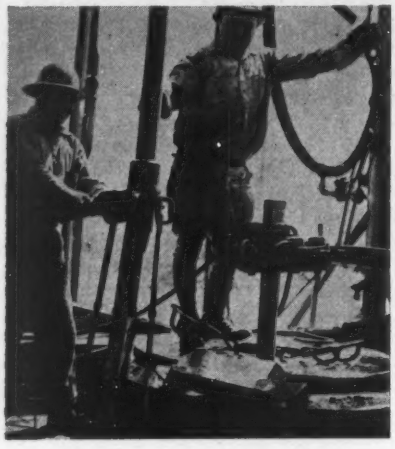
The explosion of dynamite is essentially a transient phenomenon. Almost immediately after detonation, a small volume of gas at very high pressure and temperature is substituted for the dynamite. Here is a source of a large amount of energy available for conversion into mechanical motion of the surroundings. How efficiently this highly compressed gas transmits its energy to the surrounding rock is not known even approximately, but it is suspected that it is not very efficient. It is also suspected that almost all of the work done by the dynamite is accomplished within a very short time, measured in terms of a very few thousandths of a second. There is, then, a further loss due to conversion to heat within the zone of crushing of the surrounding rock. But beyond the crushed zone, a few thousandths of a second after the explosion, we should have a hollow sphere of rock, the particles of which are in motion outward from the center, and are also under compression, having kinetic energy of motion and potential energy of resilience. These are the two types of energy that are present in an elastic wave, and we shall therefore expect to find such a wave or waves proceeding outward from the source.

The term "elastic wave" used here is one of several that are applied to the vibrations that may be transmitted by the earth. Other terms are seismic wave, longitudinal wave, compression wave, rarefaction wave, sound wave, transverse wave. Of these, seismic waves and elastic waves may be of the longitudinal or transverse type; compression, rarefaction, and sound waves being restricted terms for particular longitudinal waves. In books on earthquake seismology the term Principal wave is applied to the longitudinal wave and Secondary wave to the transverse wave, and these terms are often contracted to P and S waves in the discussion. Also, Rayleigh wave and Love wave are used as names for particular types of transverse waves that follow the surface of the ground. The Rayleigh wave is of the same type of the "ground roll" of the prospecting seismologist.

The longitudinal wave is one in which the actual motion of the particles of the earth is back and forth parallel to the direction of progress of the wave. In the transverse wave the particles of

Core racks and mud sumps come high in Aliso Canyon.

the earth move back and forth in a plane at right angles to the direction of progress of the wave. The most important class of transverse waves is that in which the wave is strongest along the interface between two media, as between earth and air, and the amplitude of the



Protecting tubing with a smile. No excuse omitting this operation.

motion decreases with distance from the interface. In the Rayleigh wave the motion is at right angles to the interface (up and down on the surface of the earth) and with Love waves the motion is parallel to the interface. Actually the motion includes some longitudinal motion, being of the nature of movement in an ellipse of which the transverse direction is the major axis.

In order to further discuss the character of the explosion-generated wave, we may here distinguish between a transient wave and one of the steady-state type. Much of the literature descriptive of waves and wave motion refers to the steady-state type of wave; partly because of the comparative simplicity of the mathematical formulas that describe steady-state wave propagation, and partly because such waves are important in many engineering problems. A steady-state wave train is one in which there is a recurring series of events spaced at regular time intervals, each exactly like the same event in the preceding cycle. The simplest type of steady-state wave train is one in which during each cycle the variable quantity has successive values proportional to the values of the sine of an angle as the angle increases from zero to 360°. Motion, according to this simple law, is called simple harmonic motion. The oscillation of a pendulum is an example and many mechanical vibrations tend to take on this type of motion. The short transient wave generated by an explosion of dynamite differs in many ways from steady-state, simple harmonic motion. This warning might be unnecessary if it were not that mathematical treatment of transient waves involves the assumption that a transient wave train may be considered equivalent to a series of steady-state waves so selected that the total effect of all of the assumed steady-state waves is the same as that of the transient wave. The series is an infinite one, however, and when we compare any single transient wave to a single steady-state wave train the difference is great.

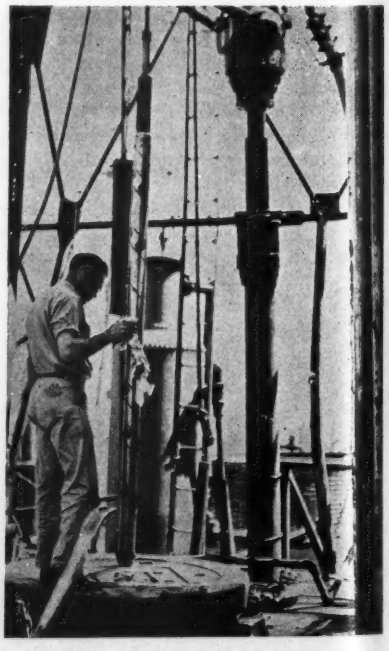
In a transient wave generated by a dynamite explosion we may expect a radiating wave with a sharp compression wave front, followed by a short series of successive rarefactions and compressions, each one of much less amplitude than its predecessor. Such a wave train is called highly damped, the term damping being applied when the decrement is due to decreasing amounts of energy available at the source for successive radiations, as well as to the decrease of energy carried by a wave train due to absorption effect of a transmitting medium only partly elastic. It seems probable that the initial compression phase of the explosion-generated transient is the most important part while the wave is still close to its source, and that the distance between successive compression phases is small as compared to the character of the reflection wave train that returns to the surface after having traveled a mile or two down into the ground and back again. This is borne out by the few fidelity records that have been made of the wave train passing instruments placed a short distance from the dynamite. It is, however, difficult to obtain such a record free from contamination by secondary waves, such as those generated by reflection from the surface of the ground. In order to avoid this interference, the Western Geophysical Co. made experiments in which the dynamite was placed under water in the ocean. These results showed the total wave train passing the recording instrument in about one hundredth of a second.

We start out, then, with an imperfect knowledge of the generated wave. As will be brought out later, we are unable to determine accurately the character of the returning reflection because of the association with it of waves of other character from which it cannot be wholly separated. We believe, however, that there is a considerable modification of the character of the wave during its travels down and back again through the earth.

Reflection Waves

In much of the discussion regarding reflection seismograph records, a reflecting interface is postulated as the cause of the reflection, probably owing to the importance of such interfaces in the problems of earthquake seismology, which was a well developed science at the time that reflection prospecting began. As a matter of fact, most of the reflections dealt with in prospecting seismograph work are from strata of a thickness less than the wave length of the outgoing wave train, and such a stratum must be considered as a unit, as a plate or diaphragm. The character of the reflection is dependent on the thickness of the bed as well as upon the differences in density and elastic moduli between it and the overlying and underlying media. There may even be several reflections from adjacent strata which when analyzed on the final record are considered as a single "reflection." Likewise reflections may arise when there is no sharp interface present, but merely a gradual change in the character of the beds. Such conditions must be borne in mind when a geologist attempts to visualize the probable reflecting characteristics of a geological section with which he is familiar.

Doubtless actual pure interface reflections also occur, though the thickness of the bed below the interface must be greater than the wave length of the approaching wave if the result is to be considered as an unmodified interface reflection. Such reflections at least have the virtue of comparatively simple equations defining the reflecting power of the interface with assumed differences in character of the media on the two sides. According to theory, whenever a longitudinal wave reaches such an interface



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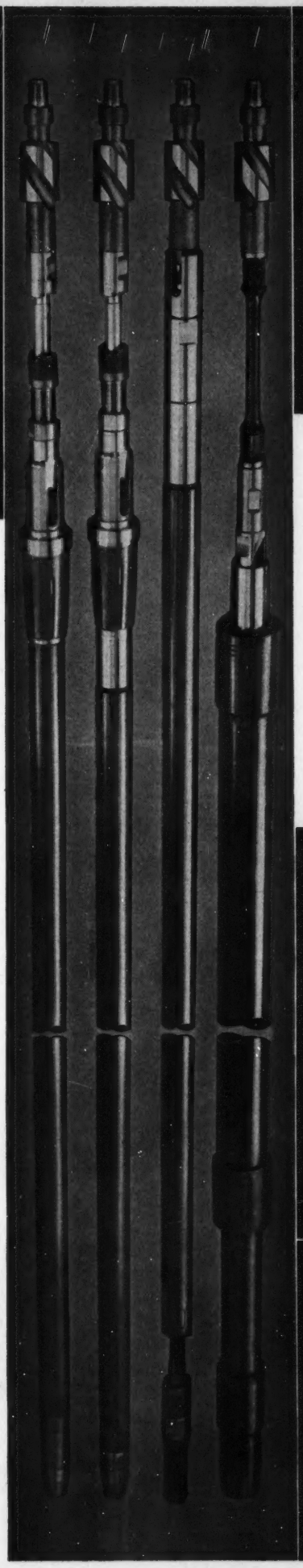

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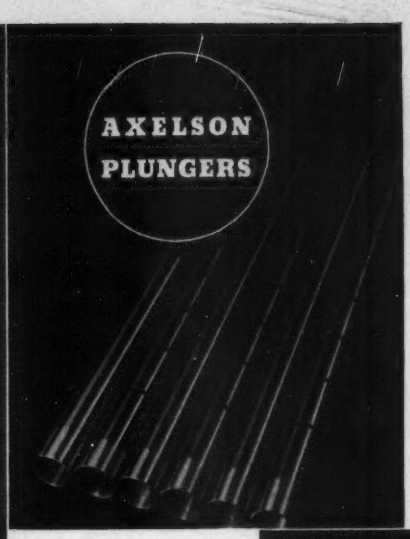

It takes a sixteen-page booklet to tell the mere outline of how Axelson plungers are made and why. It takes hundreds of thousands of dollars' worth of machines and equipment to make Axelson plungers the way they are. It has taken forty years of constant study and engineering progress to arrive at the refinements that are found in this single part of an Axelson pump, but it is these refinements and the refinements in all other Axelson pump parts that bring economy and dependability in the lifting of oil everywhere.

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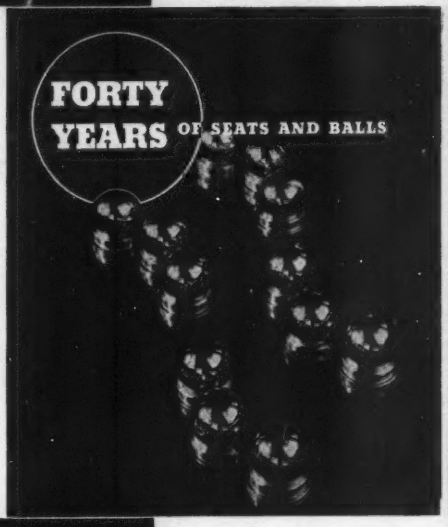

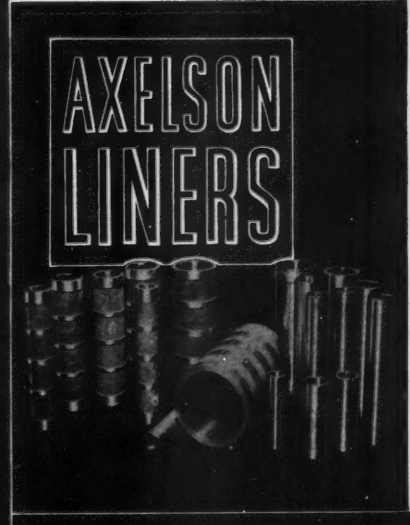

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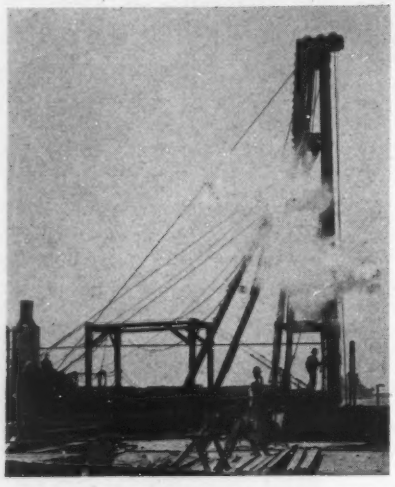
at an angle of incidence other than exactly zero degrees that is other than perpendicular in the interface it will be broken up into four different waves, a transmitted and a reflected longitudinal wave, and a transmitted and a reflected transverse wave. With a fairly small angle of incidence, as is usual in reflection seismograph work, we believe that the two resulting longitudinal waves will carry the greater part of the energy. At least we have not been able to recognize the arrival of reflected transverse waves at our surface instruments.



Oil wells will soon follow the pier out into the Pacific Ocean.

When passing from the upper medium to the lower, the transmitted longitudinal wave will be unaltered in phase. But for the reflected wave, we distinguish two cases; namely, that of reflection with the more dense medium below and that of reflection with the more dense medium above the interface. In the first case there is reversal of direction only but in the second there is reversal of both direction and phase. Thus for the more dense medium above the interface, if there is a compression phase leading before the reflection we will have a rarefaction phase leading in the wave train after the reflection takes place. This condition gives a suggestion as to the result of reflection from a thin stratum. The reflection from the lower interface of the stratum, after it passes through the upper interface, will tend to be out of phase with and cancel the reflection from the upper interface. This, of course, is in line with the common sense conclusion that a stratum of even the hardest rock as it approaches infinite thinness will not be able to send back a reflection of material magnitude.

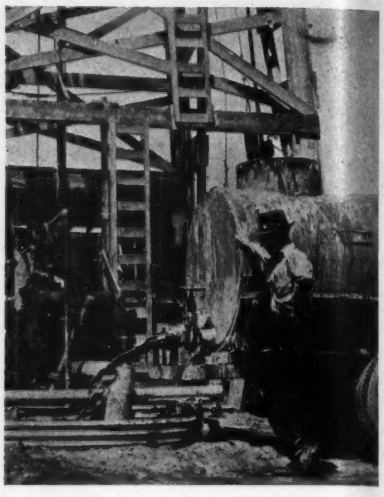
HERE AND THERE IN THE CALIFORNIA OIL FIELDS

The California Oil World believes that real oilmen, from roughneck to executive, like to see what other oilmen are doing out of the ordinary, and whatever sights of special interest may be found in the Basin, Valley and Coastal fields. The California Oil World's cameras bring to you in these pages the first of the many such views which will be a regular feature of this publication. The California Oil World welcomes suggestions for this feature.

Recording Waves

So far we have considered only the probable origin of reflection waves. Several additional classes of waves arise as a result of the explosion and of modifications in wave type by the transmitting media. The waves commonly found on a reflection record may be classified as follows. (1) first arrival, (2) direct-path compression wave, (3) reflections, (4) ground roll, (5) high-speed ground roll, (6) diffraction waves. Each of these types of wave trains may be recognized by various criteria, but owing to the instrumental characteristics of the receiving and recording apparatus their true character is not accurately recorded. A study of these waves with a high fidelity recording apparatus would be desirable, but we have not the result of any such study available to us, nor have any such results been published.

1. The first arrival or shortest time path wave is the wave used on the old refraction shooting, and is the wave train that arrives first at the recording apparatus when the latter is at a sufficient distance from the source for this wave to outdistance the direct-path wave. A sudden increase in velocity characteristics downward in the earth is necessary for the development of this wave. In reflection shooting this is the interface between weathered zone and the underlying unweathered zone. When the dynamite is placed slightly within the unweathered zone, as is usually done, a direct compression wave will follow along the lower side of the interface and approximately parallel to it, and above the interface a diffraction wave will be developed, which will travel nearly vertically upward to reach the surface of the ground. The time of travel will be that of the least time path, as calculated by the simple differ-



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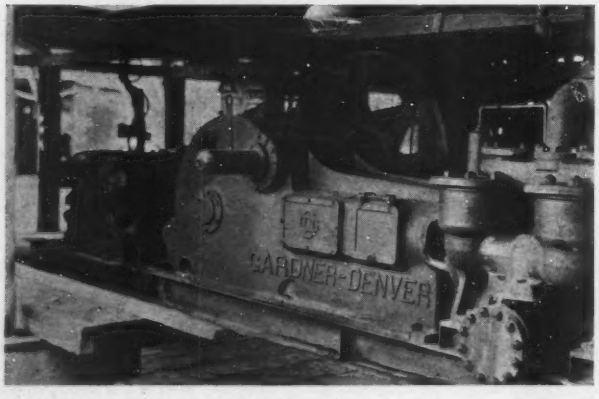

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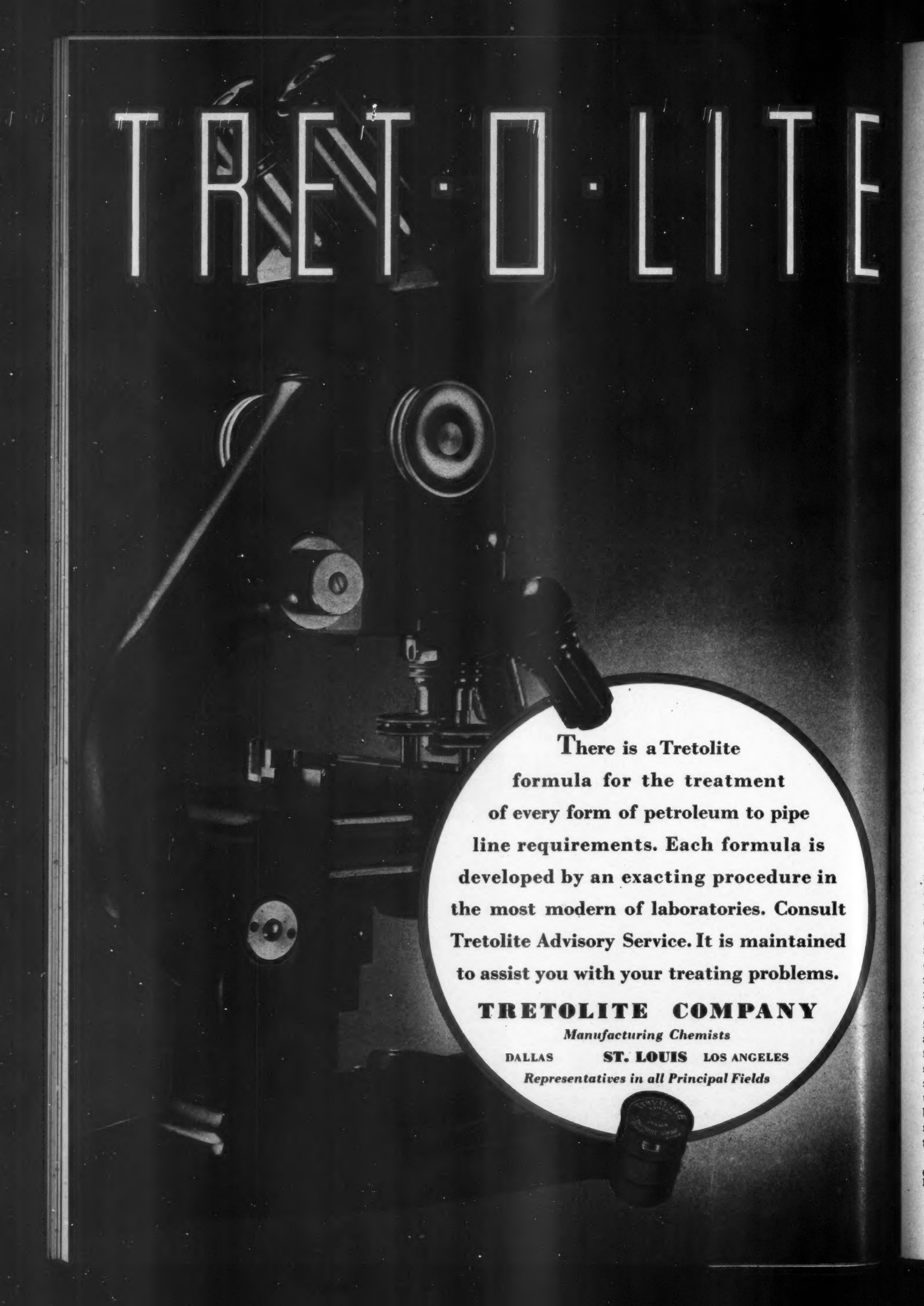

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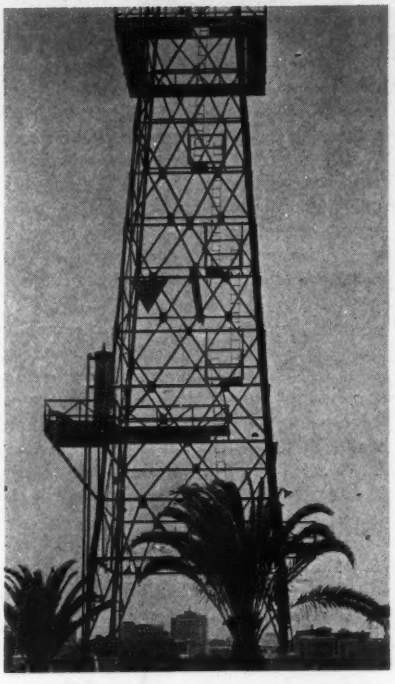
ential solution for the given geometry and velocities. Where the explosion takes place above the interface, the path will include an additional refraction at a grazing angle within the unweathered zone. The fastest wave is one of low energy content, and for this reason a maximum of sensitivity of the recording apparatus should be maintained for the proper recording of this wave. This wave is important in calculating the correction to be applied to observed travel time of reflections to eliminate the effect of variations in thickness and character of the low-velocity "weathered" surface layer.

2. The direct-path compression wave should arrive shortly after the fastest wave, and should have the maximum energy of all of the arriving waves. Actually, the shortest time path wave merges into a series of waves of increasing amplitude for several cycles, sometimes with a phase break that may indicate the first arrival of the direct wave; other places the phase break cannot be discerned. Where the initial phase of the direct wave can be discerned it ushers in a wave train of several (say six or more) cycles with gradual build-up to a maximum and gradual decay in amplitude. This is entirely unlike the single compression shock wave that we have postulated leaving the vicinity of the explosion. Possibly this wave train is made up of the direct wave merged with reflections of the same wave, which have taken place within the weathered zone between its boundary surfaces at the top of the unweathered and at the surface of the ground.

3. Reflections are the waves of principal interest, inasmuch as they are the ones that are used to calculate the subsurface structure. Sometimes a reflection may have a characteristic appearance dependent on the stratigraphic succession at the reflecting zone; thus in Oklahoma a characteristic "Viola" reflection may be recognized. Sometimes there is a sudden onset with phase interruption from the preceding energy arrival, and short duration with high damping. Such a reflection is most easily recognized, and will have its best appearance on records taken with instruments of minimum amount of filtering. Other reflections may have gradual onset and the wave train may carry through four or five cycles of sinusoidal waves of similar appearance. The one criterion we know for recognizing a "reflection" is that it shall arrive in recognizable form on several traces of the record at regular time intervals, so that when plotted out by the conventional methods used for reflections it will give a reasonable picture of geological structure. The term "usable reflection" would be more appropriate, as undoubtedly there are many reflections on bad records that are marked "No reflections," by the computer. The tendency toward build-up rather than a single shock wave suggests strongly that there is something resembling resonance in the ground and that the various strata through which the wave is reflected and refracted cause it to take on the form of a wave train of several cycles more than the original compression wave. In general, with increase of the distance that the wave travels in the ground its apparent wave length is increased. Thus deep reflections tend to be of lower frequency than those from shallower horizons. A material amount of the final character is taken on by the returning wave close to the surface. Geophones placed on the surface will give results quite different from those obtained when the geophones are buried only a few feet below the same surface positions.

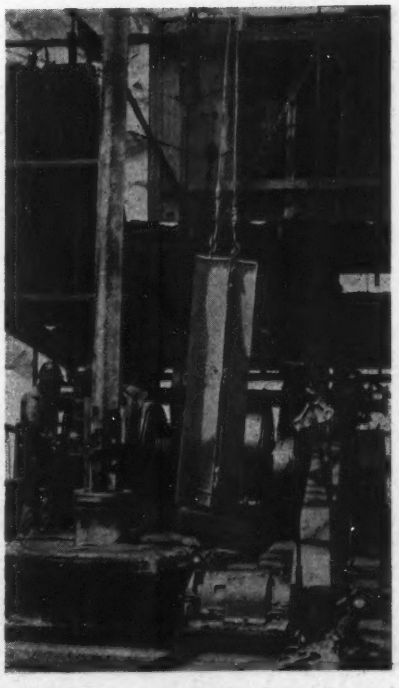


Who says derricks are not pictorial?

4. The ground roll is a Rayleigh wave generated by the direct longitudinal wave on reaching the earth air interface. With the average filtered record there is no recognizable ground roll. Yet this type of wave train often has more energy than any of the reflections and it is largely to avoid the effects of ground roll that filtering is used in the instrument construction. A typical ground roll is manifest as large waves of from 8 to 15 cycles per second average frequency, as compared to 25 to 50 cycles per second, the usual frequency limits of reflection waves. The ground roll is a transverse wave, which travels along the surface of the ground, and is the vibration that is felt at a distance when a shot goes off. It is responsible for such damage as may be caused to surface structures. Its velocity of propagation varies from 800 to 1200 ft. per sec., being greater in firmer ground.

5. The name "high-speed ground roll" has been applied to waves that arrive at successive geophones at times indicating a horizontal component of travel of around 2000 to 2500 ft. per sec. Possibly it is a transverse wave along the interface between the weathered and unweathered zones, which sends off secondary compression waves to reach the surface.

6. Mr. Rieber has called attention to the possible importance of diffraction waves in faulted structures and has illustrated their formation with model experiments. While such waves may be hard to recognize because of attenuation of their energy content due to their mode of origin, they should prove of value wherever their character can be determined and their place of origin computed. As previously stated, the fastest wave path involves a diffraction of the wave.



A $100,000 road was built to transport this to Aliso Canyon.

Reflecting Seismograph Prospecting Instruments

By ARTHUR NOMANN

Recording instruments may be conveniently described under the headings of: (1) geophones, (2) amplifiers, (3) recording cameras, (4) miscellaneous parts.

Geophones or seismometers are actuated by slight earth movements, and generate electrical currehts, which are amplified and recorded. In all geophone designs there is provision for

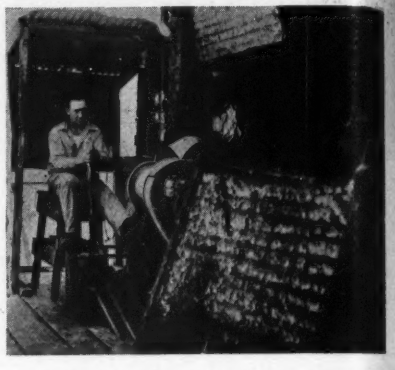
"Ham" Bell, general superintendent of Continental Oil Co. took this shot at San Miguelito. Mr. Bell is a top notch photographer.

differential movement between parts of the mechanism and the signal voltage is generated as a function of this differential movement. The part that conforms to the movement of the ground is called the support, and the part that remains more nearly stationary with respect to more distant unactuated parts of the earth is called the steady mass. The mechanical period of the geophone is the time required for an oscillation of the steady mass after an initial impulse is given it, and is determined by the effective stiffness of the spring joining the two parts together in relation to the weight of the suspended part. Geophones have been used with frequencies varying all the way from less than 10 cycles per sec. to several hundred cycles per second. Those with a natural frequency of less than, say, 100 cycles per sec. must be well damped in order to give satisfactory records. The damping usually takes the form of an oil bath, though air damping and electromagnetic damping are used. The latter has the advantage over oil that it is not subject to variations in character as a result of temperature changes, which may be sufficient to greatly change viscosity of a damping oil.

The manner in which the steady mass of a geophone is displaced in response to earth movement depends on the natural frequency and amount of damping. A low-frequency geophone with slight damping will tend to follow earth displacements directly, having its maximum steady-mass displacement at the same time that the earth has its maximum displacement from its position of rest. The steady mass will tend to remain stationary in space, receiving only slight accelerations through the suspension spring or through frictional drag. This is the type of seismometer used in much earthquake study, and the name "steady mass" is appropriate when applied to the suspended weight of this type. Many people may visualize prospecting seismometers as following the earth movement in this manner, but actually such a seismometer would not be at all suitable, because of the difficulty of reducing damping to the requisite small amount, and for other reasons. As the stiffness of the suspending spring is increased in relation to the mass of the moving part the next classificiation is approached, in which the natural period of oscillation is approximately equal to the period of the waves that it is desired to record. The differential movement that takes place in such a geophone in response to earth movement will tend to have its maximum displacement at the time of maximum velocity of the moving earth, though the relationship will not be an exact one in the transient movement of the earth that we are considering in seismograph prospecting. This is the most popular type of geophone at the present time, various models having natural frequencies varying

You'd be surprised to know how much casing is welded.

between 25 and 50 cycles per sec. As the stiffness of the spring is still further increased we reach the class of so-called acceleration sensitive geophones, of which the piezo-electric construction is a common type. Such a geophone will tend to have its maximum steady-mass displacement correspond to the maximum earth acceleration. If the natural period is high it should give a very close approximation to a fidelity record of the earth accelerations. It might at first examination be thought that either the



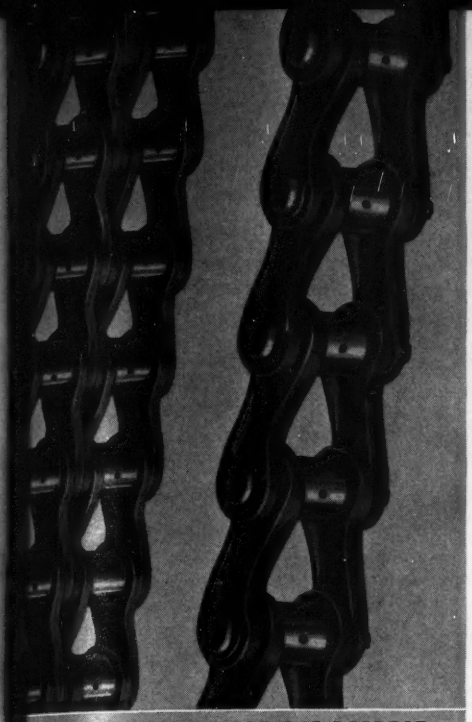
This view of a Stone drilling unit makes one wish for the life of a driller.

high-frequency or low-frequency type, giving more accurate records of the function of earth movement portrayed, would be preferable to the less exact intermediate type, but that is not true. The latter has the advantage of giving high sensitivity to the range of frequencies that it is desired to record, and the lack of fidelity of the record is more than made up for in the selective action in emphasizing the wanted reflection-wave trains in the record.

The most commonly used methods of transducing the differential movement between geophone parts into electrical impulses are Nos. 1 and 2 below. Nos. 3 and 4 are used less frequently.

1. By means of a moving coil of insulated conductor wire in a magnetic field. As the coil is moved relative to the field, the number of magnetic linkages with the coil varies and a voltage is generated in the coil. The magnitude of the generated voltage will be proportional to the rate of change of linkages, so that the voltage will tend to be proportional to the velocity of differential movement between the standing and moving parts of the geophone.

2. A coil or coils linked with a magnetic field that comprises variable air gaps in the magnetic circuit, the air gaps changing with movement of the steady mass. Changes in the size of the air gap change the reluctance of the mag-



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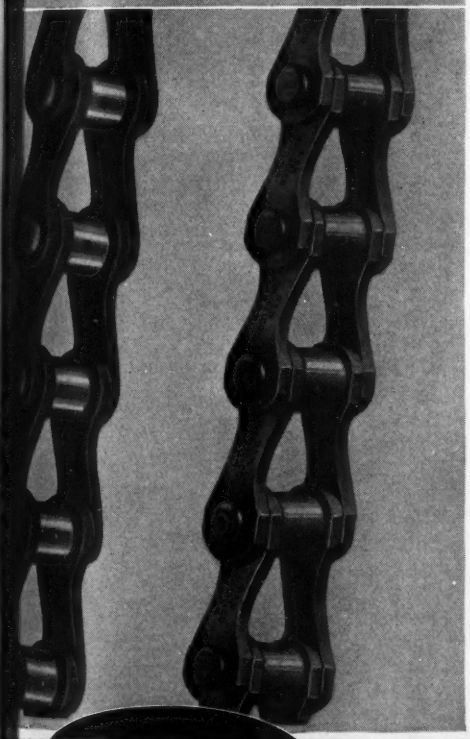

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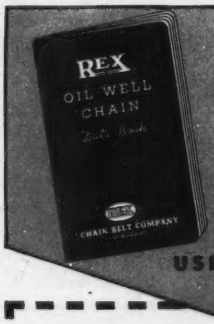

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netic circuit, and with a constant or nearly constant magnetomotive force there will be a change in the number of linkages with the coil. The voltage will vary with the velocity of differential movement between the standing and moving parts of the geophone.

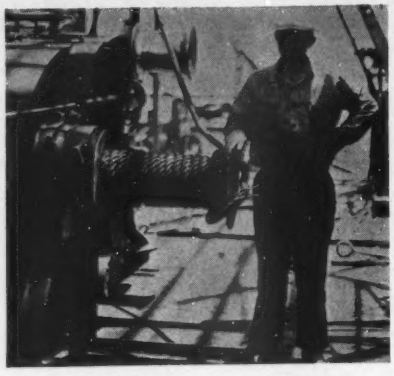
3. Piezo-electric crystal method. Certain crystals, of which quartz is often used, have the property of generating a voltage on their surfaces when they are distorted, the generated voltage being proportional to the amount of compression to which the crystal is subject.

4. Condenser type. The standing and moving parts of the geophone support closely spaced plates which act as a condenser. As the space between the plates varies their capacity as a condenser changes. If a fixed voltage difference is maintained between the plates, there will be a current flow to or from the condenser as its capacity changes, and this current flow can be used to produce a signal for amplification and recording.

For protection in handling, the geophone mechanism is enclosed in a metal case, which serves the further function of shielding the electrical generating mechanism from disturbing electrostatic and magnetic fields that may be present, particularly in the vicinity of electrical machinery and power lines. Adequate means must also be taken to prevent earth currents from getting into the signal circuit. The exterior case commonly takes the form of a cylinder from 4 to 6 in. in diameter, and the weight of the geophone may vary between 5 and 25 lbs. The cylindrical geophones are particularly adapted to the practice of burying the geophones in holes slightly deeper than the height of the geophone. With the recent trend toward multiple geophones, there has also arisen the practice of placing them directly on the surface of the ground, and for this purpose the beehive shape is suitable. This is a hemisphere, of which the flat side is placed down and the rounded top will be less disturbed by wind than other shapes.

Amplifiers

The amplifiers come next in the sequence between the earth movement and the final paper record of the movement. The primary purpose is to amplify the signal current as it comes from the geophone until it is capable of actuating the recording galvanometers. The character of the signal is more or less modified in the amplifiers, partly as a matter of necessity and partly from choice. The modification present by choice is given the name "filtering," and is provided to accentuate the reflections and to cut out, as much as is possible without too seriously affecting the reflections, other wave trains that tend to obscure the reflection record. The filters tend to accentuate oscillations of a frequency between 30 and 50 cycles per sec., as these are the commonest reflection frequencies. Such filtering can be had only at



R. D. "Whitey" Digher, welder on Severns lease, devised this ingenious cat line reel.

the expense of loss in character of the reflections themselves and therefore must be considered a necessary evil rather than an unmixed blessing of which the more the better. The amplification itself is of the familiar vacuum-tube type used in radio sets. From two to four stages of amplification are necessary, according to the character of the other parts of the system, and the total gain in decibels may vary from 40 to 80.

Recent innovations in amplifier design include the provision of several alternative filtering circuits, so that the observer may fit the filtering to the particular requirements of the area being explored. Much of the excellence of the various secret seismograph designs is said to lie in the character of the filter circuit, and extravagant claims are made for the almost human intelligence displayed by such filters in passing the wanted reflections for recording and excluding the undesirable vibrations. While it is possible to design a very bad filter circuit, it would seem that there are simple principles of design which if followed should lead to filters as good as can be made for the particular character of filtering and the amount produced. The most difficult question is to determine exactly what type and amount of filtering is desirable. Since neither the character of the wanted reflection wave trains or of the unwanted wave trains is precisely known, and both probably vary considerably from place to place, the determination of a satisfactory filter is pretty much of a problem of cut and try, and to a considerable extent a matter of individual preference. When every effort is made to carry on the survey by correlation methods, a slightly filtered record, even though it may appear ragged and uneven, will be preferred because the successive cycles of a reflection wave train will tend to have individual character that will make the jumping from one cycle to an adjacent one less likely. Those who rely on the dip method in the more difficult areas will prefer a more symmetrical record, produced with more severe filtering. The pulses will be almost identical from string to string and the arrival times will be evenly spaced from the top to the bottom string of the record, so that the dip computation becomes a comparatively simple matter.

In still more difficult shooting territory, a device variously known as the compound or running average hookup is used to make it possible to follow a reflection pulse across the record. Each of the interior strings is actuated by energy that comes partly from the particular geophone upon which the string would normally depend for its energy and partly from each of the adjacent geophones. In this way a uniformity is imparted to the record that facilitates the tracing of a pulse through successive strings from the top to the bottom of the record.

Most recording systems now include a sensitivity control against time, which is called an expander. The energy returning in reflections tends to become more attenuated as the travel path increases in length, and therefore the earlier arriving reflections have more energy than the later. Without some sensitivity control as a function of time, a record tends to have excessive amplitude in the early part and die away to undesirably small amplitude later. The expander causes the sensitivity of the recording system to increase with time at such a rate as to compensate for the decreasing signal intensity. One type of expander involves predetermined change in over-all gain of the amplifier unit with flow of time after the first reflection arrives. This may be achieved with variable bias tubes. The same effect may be achieved by varying the sensitivity in the other parts of the apparatus.

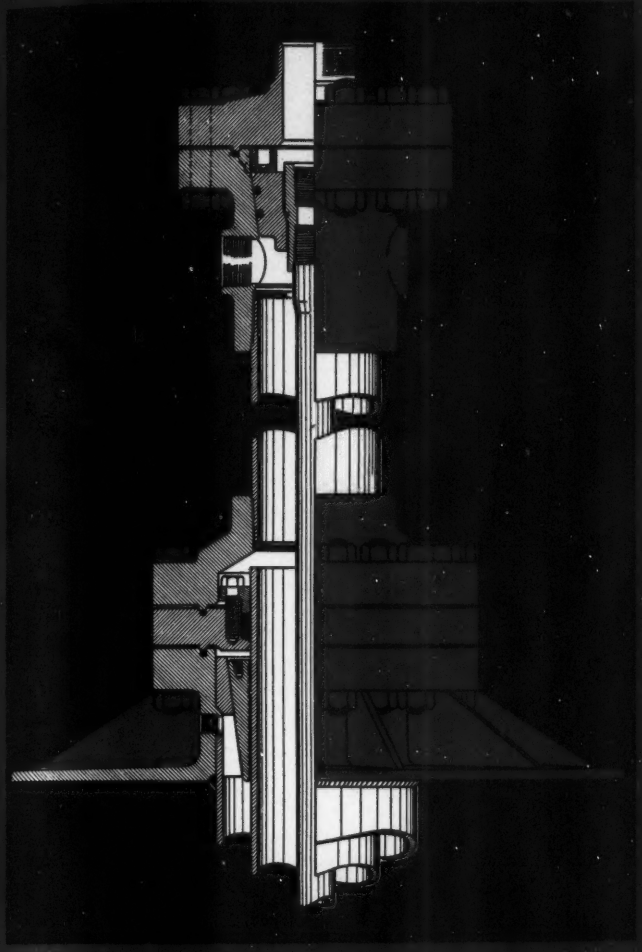
Another type of expander controls the amplitude by the same method as the automatic volume control of radio sets. By this system the energy arriving over a particular time interval is used to control the sensitivity of the apparatus for an immediately following time interval, a low rate of energy arrival permitting a greater sensitivity of the apparatus in the following time interval. The control average must be taken over a sufficient length of time so that it does not tend to unduly discourage short bursts of energy arrival from being shown on the record, otherwise a good high amplitude reflection would be smothered by the regulating device. Such an expander will produce a record

(Continued on Page 42)

For quickly landing and packing off

REGAN
Slip-suspension
CASING HEAD

These heads permit the inner string of casing to be quickly landed and packed off as soon after cementing as the operator may desire. The system of landing and packing off is extremely simple, quick and efficient. The body may be threaded, either male or female, at its lower end, for connecting to the outer casing, or may be bored blank to slip over the casing and be welded on. The casing may be entirely supported by the elevators until the slips are set.

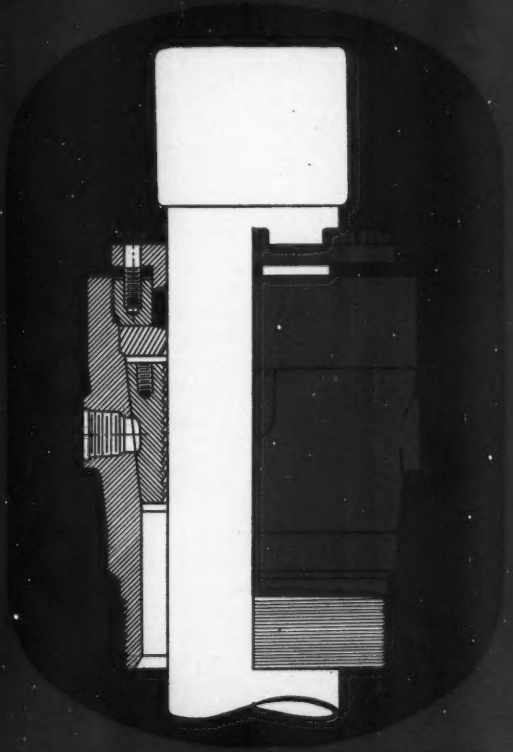


Hook-up of Regan Casing Head, Model 5, Slip-type Landing Base and GC Model 8 Double Plug Tubing Head.

Type BG-4, Class A	3000 Lbs. Test
BG-4, Class B	6000 Lbs. Test
BG-4, Class MB	4000 Lbs. Test
Type 27-4 (2-string only)	3000 Lbs. Test

In the 27-4 Type the pipe need not be cut until the head is completely packed off as the stuffing box and packing gland are arranged to pass over the coupling. This allows the operator to land his casing with a collar up if desired and, if conditions permit, to measure the casing in to some convenient distance off bottom. Having a collar just above the casing head is frequently convenient for affording the operator a means to connect a tubing head directly to the casing and to complete the Christmas tree and flow connections below the rig floor.

Full information upon request or refer to Composite Catalog.



General arrangement of Regan Type 27-4 Slip Suspension Casing Head with female connection to outer casing.

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Public Relations Possibilities in all Branches of the Petroleum Industry*

By James Tanham,
The Texas Co., New York, N. Y.

You have no choice about public relations. The day you or your company started business, that day public relations started with you. But you do have a choice about the state of your public relations.

Many companies represented here today are great companies in the public mind because, consciously or unconsciously, the men who represented those companies in their early years and those that represent them now have personified in the public the qualities that appeal to the public.

It takes a lot of little men to make a big company. Every man that works for you has the power in his sphere of influence to help your standing in the public's opinion.

Public relations includes helping those men who represent your company, even those in humble positions in remote locations, to know better the personality of their company and to understand more fully its place in the sphere of industry, enabling them more intelligently to defend their company and their industry where necessary, making them truer interpreters of the place this industry occupies in American industrial life, making them proud and loyal to the company and to the industry because they understand its spirit and functions better.

Public relations can be made discouragingly complicated or attractively simple. I choose the latter because, as I see it, it is simple when properly presented and understood.

Why are your friends your friends? Isn't it because they understand you and because you have been friendly with them? Public relations to me is only the multiplication of understanding and friendship among the groups comprising the public by the groups comprising the industry. It is the human relation we call friendship, based upon understanding and good will, practiced on a wide scale by you and all others in this industry.

If you are not sure about the loyalty of your employees, you really need public relations. If you wonder if your dealers are antagonistic, don't lose any time in getting busy on public relations there. If you question that your stockholders are with you in your policies and practices, watch out! Somewhere sometime, you slipped on public relations there.

And don't think that because you have customers that they are all rooting for you. They may like your products but be indifferent or antagonistic toward you,

James Tanham

either because there is something wrong about your company or because they think that there is something wrong; or because they just don't know enough about you to know that you are all right. In any event, a little more information and a little more cultivation is a smart precaution. They will be more constant customers and better boosters if they like you as well as your products.

The time to cultivate good will is before you need it. When you need it, you need it quickly, and the time for cultivation is not there. Start early and keep it up, and by so doing you may avoid ever needing it.

It was high time that this industry understood an organized movement to examine and improve its public relations. Other industries long ago not only sensed the need for better public relations but took steps to cultivate the good opinion of the public. The telephone companies very early were at work in this field. Later we find steel, railroads, milk, copper, banks, utilities, motors, the beer and other industries have become keenly diligent to win the interest and the esteem of the public.

In our day, the American people, probably through necessity, are examining and weighing perhaps as never before in our history, the value of industry as a whole, and the contributions of particular industries to the economic and social well-being of the nation.

The time is right, the public is anxious to learn more about industry, and fortunately for us, the petroleum industry has much about it that the American public can admire and appreciate.

The story of this industry fits well the pattern of what we proudly call The American Way. It is a story of pioneering, of using all of our resources of research, engineering, administration to bring the greatest good within the reach of the greatest number of people.

It is a story of success, not of failure.

It is a story of American achievement without Governmental favor or subsidy.

It is a story of accomplishment not only for the public at large, but for the millions who have served within the industry.

The people within the industry as well as those outside the industry are going to benefit by a new understanding and appreciation of this industry as this program of public relations moves forward. It has had a splendid beginning. It has enlisted practically universal endorsement throughout the industry. It should accomplish much good in many ways as each company and each individual in each company finds the part of the job that the company and the individual can do and which from my personal observation over most of the country, practically every one, producer, refiner, marketer, jobber, and all in other branches, are eager to do.

There is nothing mysterious or mystical about public relations. They do not contradict but in fact reinforce many of the things which we consider just good business practices without differentiating them as public relations activities.

After we simmer out all the superfluities, public relations means just two things:

First—To be the kind of a company or industry that the public will approve.

Second—To make sure that the public knows the kind of company or industry you are.

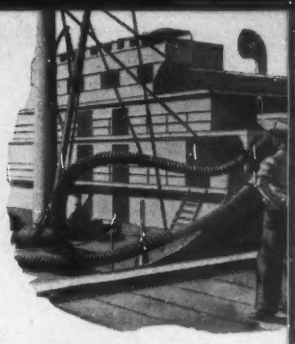
As has wisely been observed by so many, the possibilities for public relations start right at home. For a company they begin right in the plant among the company's employes. No company can enjoy a reputation different from that given to it by its own employes. This morning's symposium carries the subject "Industrial Relations as Public Relations," to be discussed by Mr. Dooley of the Socony-Vacuum Oil Company and properly gives prominence to this first great possibility that the companies com-

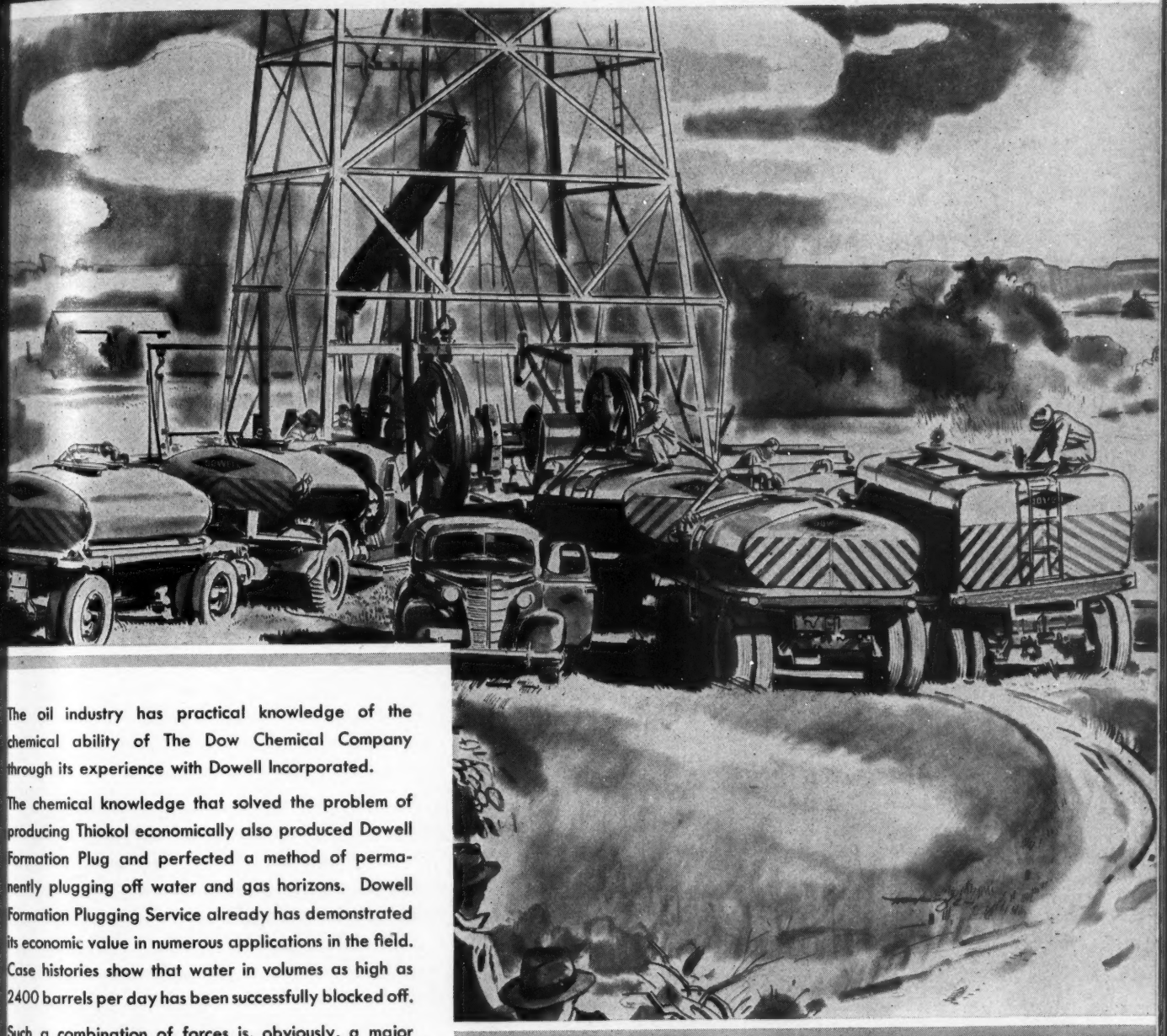
*Presented at mid-year meeting American Petroleum Institute, New Orleans, La.

A NEW DEVELOPMENT for The Dow Chemical Company is the manufacture of "Thiokol," a synthetic rubber. This man-made rubber resists the action of oil, water, sunlight and air—the enemies of natural rubber.

Hose made of, or lined with, Thiokol is today widely used in the handling of petroleum products.

TRADE DOW MARK





The oil industry has practical knowledge of the chemical ability of The Dow Chemical Company through its experience with Dowell Incorporated.

The chemical knowledge that solved the problem of producing Thiokol economically also produced Dowell Formation Plug and perfected a method of permanently plugging off water and gas horizons. Dowell Formation Plugging Service already has demonstrated its economic value in numerous applications in the field. Case histories show that water in volumes as high as 2400 barrels per day has been successfully blocked off.

Such a combination of forces is, obviously, a major influence in the oil-producing industry. Already untold millions of dollars in additional recovery are credited to Dowell methods and materials. And what has been, and is being done, by Dowell is only an indication of what Dowell will do in the future.

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Oil men who attend the Golden Gate International Exposition are cordially invited to visit the Dowell exhibit in The Dow Chemical Company Booth.

DOWELL

OIL AND GAS WELL CHEMICAL SERVICE

prising this industry enjoy to build better public relations.

For an industry, better public relations start right within the industry. A warring industry, torn by strife and misunderstanding, airing its internal differences in the press, cannot enjoy the confidence of the public.

It would be strange if this industry had no difference. The interests comprising this industry are so diversified, the industry is so extensive, its operations so varied, that rarely is any one man, however privileged, able to comprehend the many involved phases of the industry, much less to know in adequate detail the interplay of interests among the branches of the industry.

Probably there always will be differences within the industry. But these need not divide the industry. Nor are they helped by publicizing them. Many of them, very probably, will be solved by discussion around the table at national, regional, state and local committees on public relations. Certainly it will be illuminating to many who have learned in the past few years of the petty grievances that frequently lead to labor trouble to find that some of the attitudes in this industry are based upon things just as easily remedied as were the petty grievances that caused industrial strife, little things that you want voluntarily to correct as soon as you learn of them.

One of the many great possibilities of this public relations movement is the creation of forums where the things that cause dissension can be brought to light and where those who can remedy them will learn of them, not necessarily in a critical way but in a constructive atmosphere.

This morning's program carries just that opportunity. Many have said that the dealer relationship with supplying companies needs attention. Here a little later that very problem is to be presented from both sides, by Mr. Brown and Mr. Lakin. I don't know what either of these gentlemen will say but I predict that every man in this room could help his company by taking back for consideration some of the things that both Mr. Brown and Mr. Lakin will suggest for the improvement of the dealer-supplier relationship.

We are particularly fortunate because of the ease with which we can reach our audience. Over a million people work in this industry. Over two million own stocks or bonds of oil companies, or receive royalty checks for oil. The radio audiences of oil companies using the air include practically the whole nation. We have house organs for stockholders, for dealers, for employes. Our possibilities for contacting the public are undoubtedly more numerous and frequent than those of any other industry. Probably every week at least 25 to 30 million motorists stop to purchase our products.

Danny Spreight, member of Shell Employes Club, who put in many long hours helping in the erection of the Club House, assists W. L. Bagby, Ventura Production Manager for Shell Oil Company, Incorporated, in sealing the corner stone at the recent dedication of the Club House, at Ventura.

The whole public relations movement is an endeavor by the industry, and by every branch of the industry and every unit, large and small, to use the opportunities so easily accessible to all of us

P. H. Patchin, Standard,
Chairman Pacific Coast Region
A.P.I. Public Relations Committee

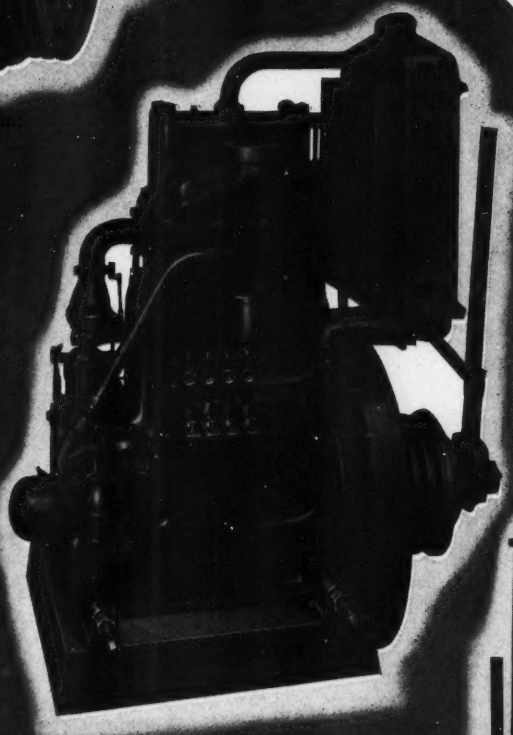
for the purpose of building a better appreciation of the industry and a wider recognition of the part the industry plays in the economic life of the nation

In our early approaches we may think that the practice of public relations is something separate and distinct from those practices which we accept as ordinary good business practices. But they are not. They are in essence exactly the things that you like to do to win the respect of an important customer. You probably like to demonstrate your ability to serve him well. Perhaps you create the opportunity to show him your plant and explain some of your labor policies that you feel help to keep your working force contented and on the job so that he can count upon uninterrupted service. Possibly you have him meet your executives and department heads so that he can see for himself that they are regular people, democratic, interested in him and able and anxious to serve him.

Public relations is the extension of this practice to include a much wider circle of contacts. You can't take all your stockholders through your plant but if you have a house organ you can tell them regularly with picture and story things about your business and the oil business generally which will interest them and give them a better

Superior ENGINES

SUPERIOR MODELS "DV", "E" and "FB" are medium speed, 2-cycle, 2-cylinder gas engines for any well pumping load from smallest up to 30 H.P. . . . . First cost competitive . . . . Installation cost is practically same as for high-speed multi-cylinder engines . . . . Reliability and low operating costs are comparable with slow-speed engines . . . . Heavy duty, crosshead type design for low repair expense and small lube oil consumption . . . . Timken roller main bearings . . . Rated for 24-hour continuous service . . . . Simple . . . Easy to start . . . Long life.



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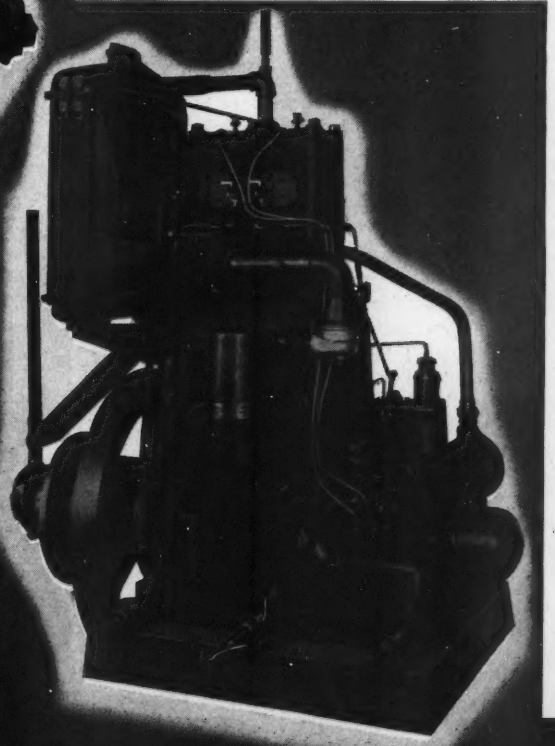

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NATIONAL

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understanding of the industry. When you are lucky enough to be able to send them a dividend, a little pamphlet with the check costs practically nothing and no extra postage, but does give the opportunity to remind them of some aspect of the industry about which their understanding may some day or even now be important.

Many firms have found it profitable to set aside a day or more as community day and invite the community to see their plant. Others have found that employes appreciate the privilege of having their families visit the plant. Employes have shown pride in exhibiting their place of work to their families and friends.

There are probably hundreds of opportunities waiting for use. The Committee on Public Relations has prepared what is commonly called a check list from which any company, large or small, may easily select the most appropriate media for improving relationships and creating better understanding.

One of the first important things in any organization starting on public relations work is to enlist the co-operation of the entire organization. To do this you must recognize that the best results can accrue only when the entire organization is public relations minded.

Some parts of any organization will recognize the desirability of good public relations without any pressure. Others will wait for a signal from their superiors. Therefore, generally the success of any company in this work will depend upon the attitude of the ranking officials.

If they are indifferent, the organization will be cool. If they are enthusiastic, that attitude will carry down through the ranks. And it is down in the ranks, particularly among local people, in plants, in selling forces, that the possibilities are greatest because the opportunities for contacts are most numerous.

To summarize, then, public relations is an undertaking that is good business for the individual company as well as for the industry.

It will help to improve relationships within industry, between employer and employee, between supplier and dealer, between communities and companies, between stockholders and management, between royalty owners and other groups within and without the industry with which the industry has dealings, and finally through all of these groups it will promote better feeling based upon better understanding with the public generally.

It will help to eliminate many present sources of conflict by providing forums in regional and state committees where these questions can be brought to light, discussed in an atmosphere of cooperation, and with greater knowledge, remedies, instead of continuing as a sore spot within the industrial family.

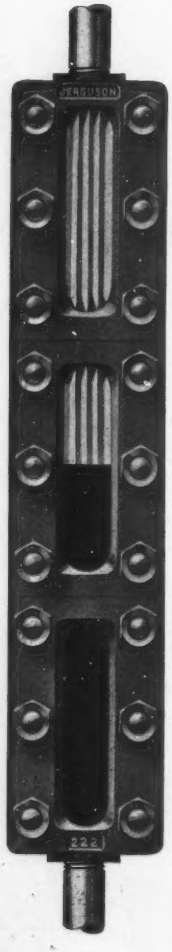
By helping the industry to know the causes of misunderstanding and to straighten them out, it will reduce the number of ills that so frequently furnish material for unfavorable publicity about the industry.

By the reduction of conflict within the industry and the increase within and without the industry of knowledge and understanding of the industry, loyalty of employees, dealers and of the public will be strengthened.

It will make this industry less frequently the object of unnecessary political attack because pressure groups and individuals seeking public favor by criticizing the industry will face a public opinion that knows better because it has been informed.

And finally, remember that the practice of good public relations is a feature of industrial democracy at work in a country that is still a democracy and which we will help to continue as a democracy if we persist in exercising the democratic privilege of appeal to the people who, in the final analysis, constitute the democracy.

JERGUSON



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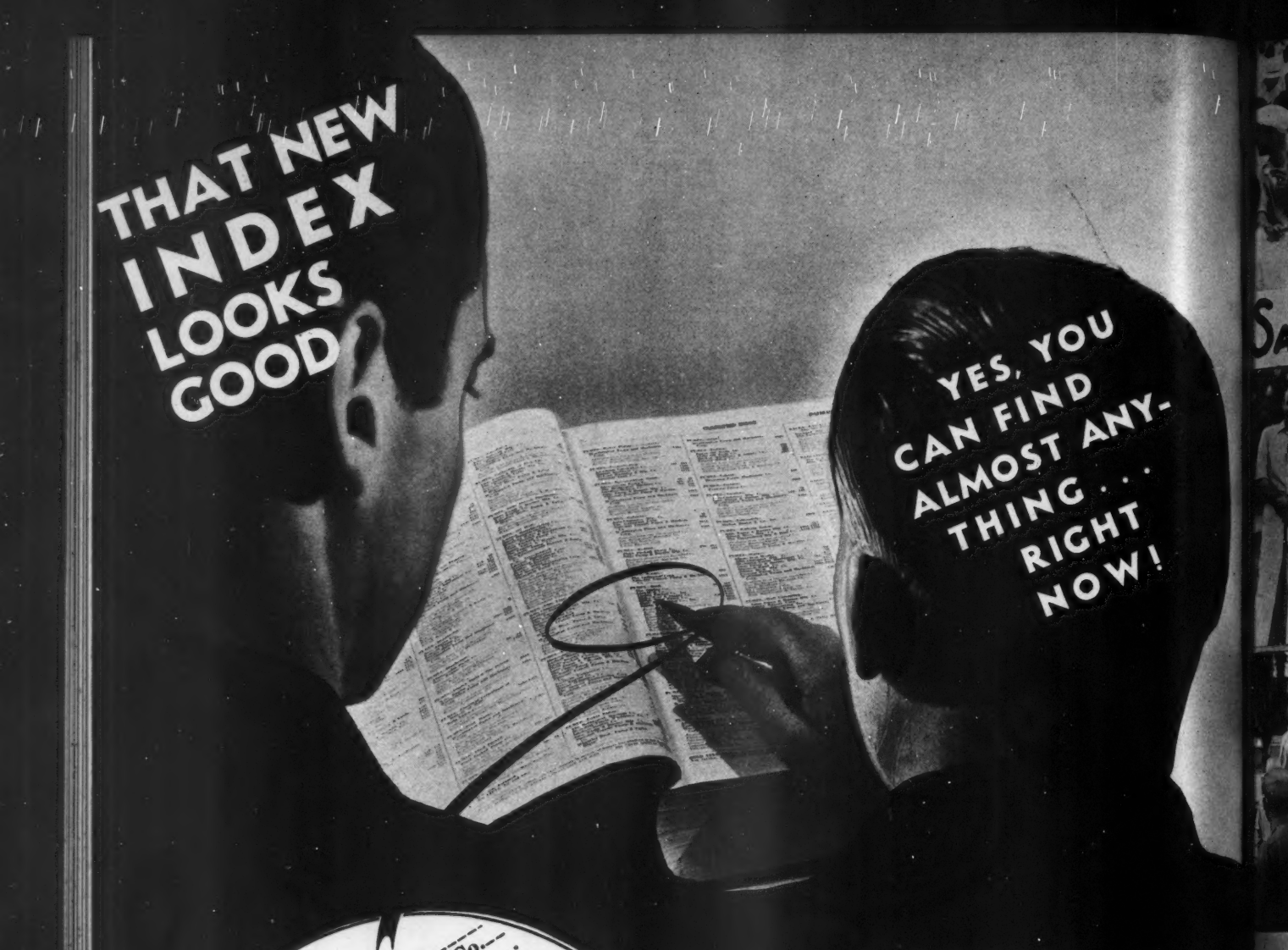

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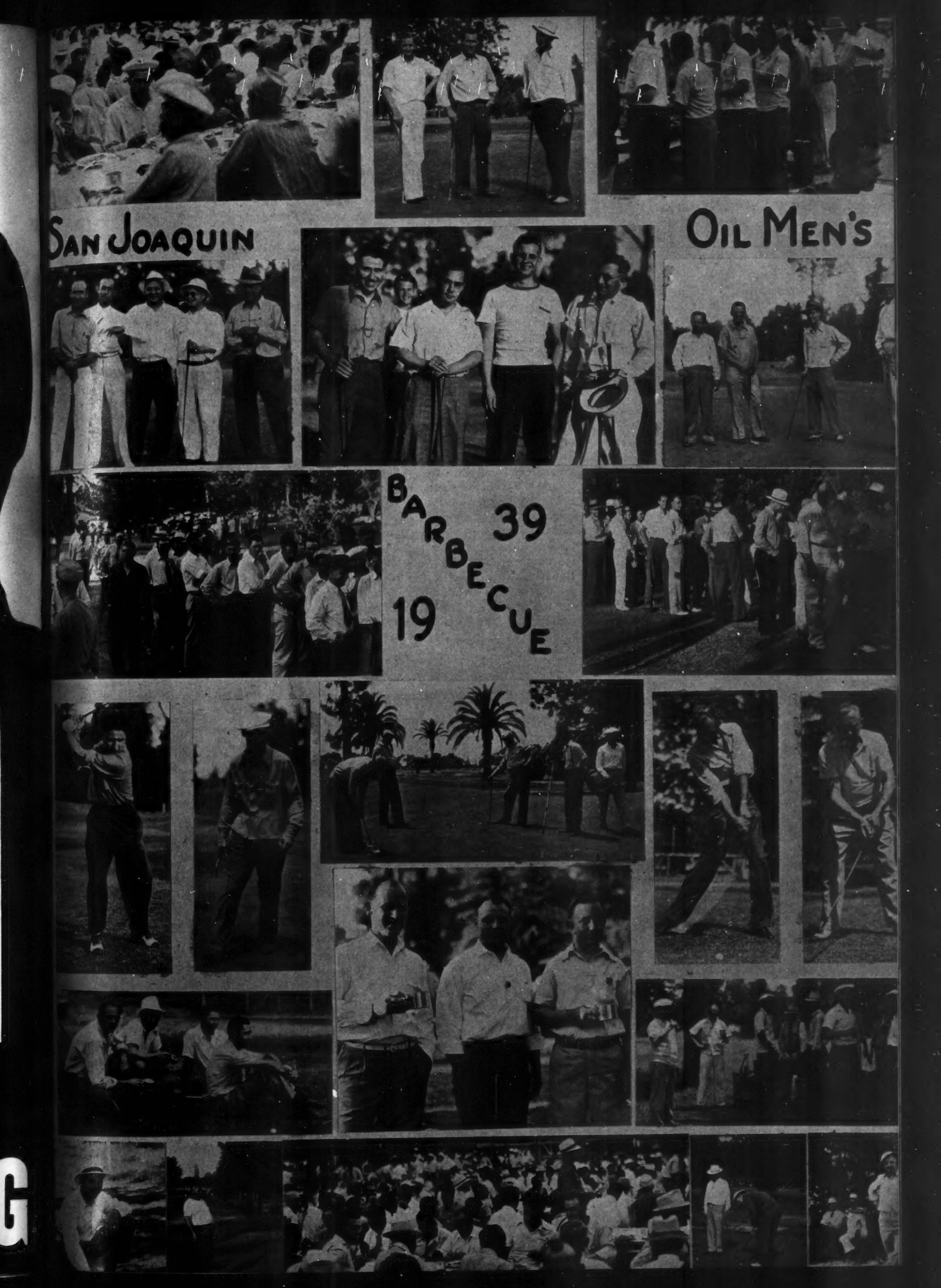
1939 COMPOSITE CATALOG


SAN JOAQUIN
OIL MEN'S
BARBECUE
19 39

(Continued from Page 14)

that is very even in appearance as each channel (recording unit) is made self-regulating to the same level of amplitude as the others, and differences in energy arrival between the different channels are eliminated. The expander should be so constructed that it varies the amplitude of the record but as nearly as possible does not otherwise affect its character.

Recording Camera

The recording camera contains the mechanism that takes the amplified signal currents from the amplifier and produces a corresponding written record. All cameras now use photographic paper as a recording medium. The paper rolls may be from 100 to 250 ft. long and from 3 to 8 in. wide. The paper is fed through the recorder at rates of 12 to 18 in. per sec. and parallel lines across the paper spaced at intervals to represent hundredths of a second are imaged in the paper at the same time that the reflection record is being taken.

The accuracy of the time interval represented by the timing lines should be not less than one part in 5000. This corresponds in accuracy to a watch that gains or loses 20 sec. per day. However, the mechanism of a watch does not measure with the required accuracy the very short time intervals involved, and a "timing fork" is used to control the time lines. A fork is a slotted slab of metal of which the two tines vibrate at a natural frequency determined by its shape and the character of the metal used, and is very similar to a "tuning fork" used for musical pitch control. The forks are self-driven by electrical means, and are equipped to furnish an alternating current, which is used to control the timing lines. Tests should be made to make sure that the mechanical vibrations reaching the recording truck from the dynamite explosion do not disturb the accuracy of the fork.

The records of the geophone signals may be either black lines on a white background or white lines on a black background, the former being the more popular. The black lines are made by a light spot focused on the paper. In the optical train of this light is a mirror to which is attached a tiny flattened coil of insulated copper wire in a magnetic field. When the signal current passes through the coil the latter is caused to rotate, by the electromagnetic interaction, and the movement of the mirror causes the light spot on the paper to oscillate. The combination of the oscillation of the light spot and the simultaneous travel of the paper records a sinusoidal trace indicating the earth movement. The white on black records are made with an Einthoven string galvanometer. The light falls on the paper everywhere except for a tiny focused shadow of a small section of a very fine stretched wire. The fine wire lies in a magnetic field and when the signal current passes through it there is a slight deflection of the wire due to the same electromagnetic relation that causes a coil to rotate, and a shadowgraph record is written. There is no essential difference between the records written by these two types of galvanometers, preference for one or the other being based on such considerations as sensitivity, construction cost, strength and liability to breakdown, ease of repair, etc.

Natural frequencies considered desirable for galvanometers vary between 50 and 300 cycles per second. Those of lower frequency should be critically or nearly critically damped. With the higher frequencies the amount of damping may be less. Damping may be accomplished either with oil or electromagnetically. For the higher frequency mentioned, and especially if still higher frequencies are desired, the string type of galvanometer is the more sensitive. If periods in the lower frequency range are desired the coil type of galvanometer is likely to be the more satisfactory. As with the geophones, galvanometers that have frequencies within the range of the principal frequencies of the reflections necessarily distort the record. The same

(Continued on Page 42)

More than 250 men and women attended the Baker O[illegible]s Da[illegible]

C. N. G. A. Elects Officers, Directors

Newly-elected officers and directors of the California Natural Gasoline Association are: President, P. S. Magruder, General Petroleum Corp.; vice president, L. V. Cassaday, Lomita Gasoline Corp.; secretary-treasurer, George L. Tyler (reappointment for coming year to be confirmed by directors in July).

Directors

B. D. Balthis, Natural Gas Equipment Inc.; A. H. Bell, Continental Oil Co.; A. H. Bradford, West Coast Refining Co.; J. C. Burks, O. C. Field Gasoline Corp.; J. A. Campbell; **F. J. Colton,** Tide Water Associated Oil Co.; F. E. Coyle, Tide Water Associated Oil Co.; F. E. Davie, Shell Oil Co., Inc., and Earle Derby, Standard Oil Co. of Calif.

H. L. Eggleston, Gilmore-Dabney, Inc.; O. C. Field, O. C. Field Gasoline Corp.; **Harry Fiske,** Ingersoll-Rand Co.; **J. S. Fluor, Jr.,** Fluor Corp.; **M. L. Fort,** Industrial Fuel Supply Co.; **C. D. Gard,** Union Oil Co. (to be confirmed at directors' meeting); R. D. Gibbs, Union Oil Co.; J. C. Gilbert, Barnsdall Oil Co.; R. H. Green, Signal Oil Co.; R. W. Heath, Signal Oil Co.; W. A. Kirk, California Southern Oil Co., and Ben Koehler, Getty-Pacific Western Oil Co.

W. H. Kraft, Honolulu Oil Corp. Ltd.; H. R. Linhoff, Richfield Oil Corp.; **F. A. E. Lowell,** Del Rey Oil & Gas Co.; A. C. Lyles, Kettleman North Dome Assn.; R. S. Lytle, Los Nietos Producing & Rfg. Co.; S. F. Magor, Superior Oil Co.; P. S. Magruder, General Petroleum Corp.; G. C. McLaren, Standard Oil Co. of Calif.; William Moeller, Jr., Southern Calif. Gas Co.; H. E. Moulton, Chanslor-Canfield Midway Oil Co., and N. H. Mull, The Texas Co.

H. M. Paulsen, Bankline-Norwalk Co.; **W. W. Robinson, Jr.,** The Texas Co.; W. D. Roper, Western States Gasoline Corp.; W. D. Smith, Wilshire Oil Co.; T. L. Taggart, Standard Oil Co.; R. S. Tulin Shell Oil Co. Inc.; Henry N. Wade, Parkhill-Wade, Inc.; R. C. Wheeler, General Petroleum Corp., and L. M. Windle, Richfield Oil Corp.

Taft Chapter Chairman is M. J. Binckley, Southern Calif. Gas Co. Names in bold face are serving as directors for their first year.

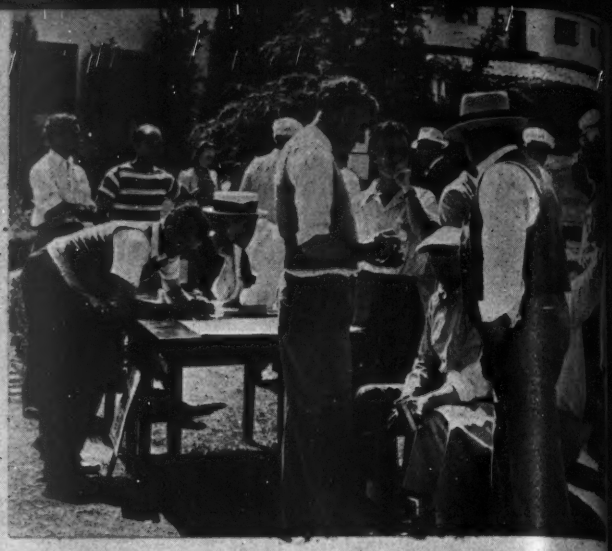
Attendance reached a new record, 435, at the annual June Frolic of the Association at the Brentwood Country Club. The number of entrants in the golf tournament was more than proportionately larger than in the past. For the first time in the history of the Frolics, the palms in baseball went to the "Independents" the "Majors" going down egregiously. Horseshoe tossers and badminton racketeers plied their art before large galleries.

P. S. Magruder

The annual affair closed with a decorous, yet highly entertaining exhibition of legerdemain, humor, acrobatics and the like. On the following pages appear "candid shots" taken during the games and festivities.

The master of ceremonies was Harold Linhoff, retiring president whose tenure has been marked by notable advances in the association's technical contributions.

s Dance recently at the Maywood Municipal Auditorium.



C.N.G.A. 1939

JUNE FROLIC

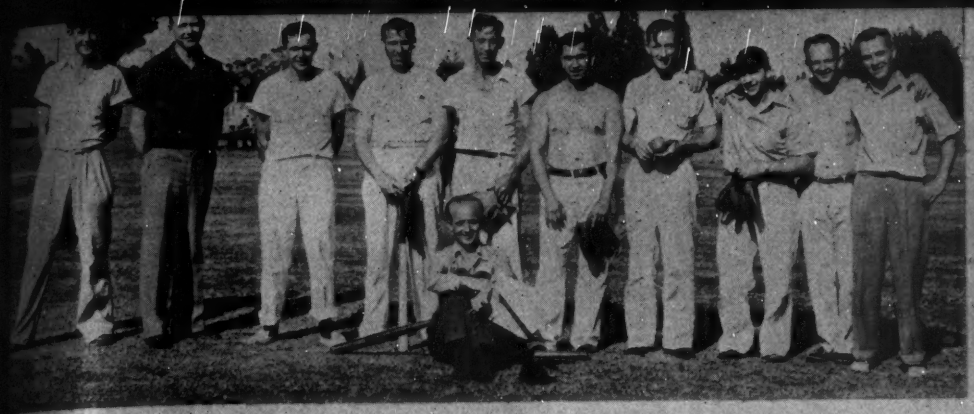
C.N.G.A. 1939

JUNE FROLIC

FROLIC

C.N.G.A.

1939



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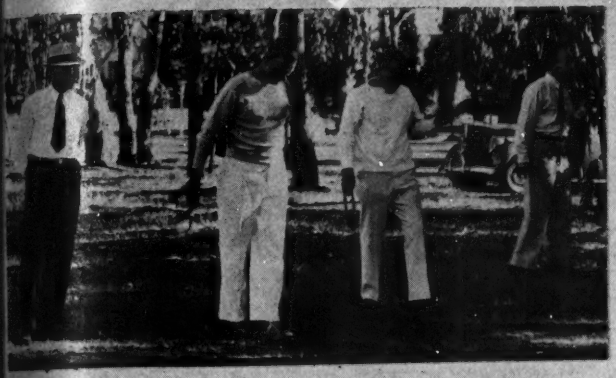


JUNE

FROLIC

1939

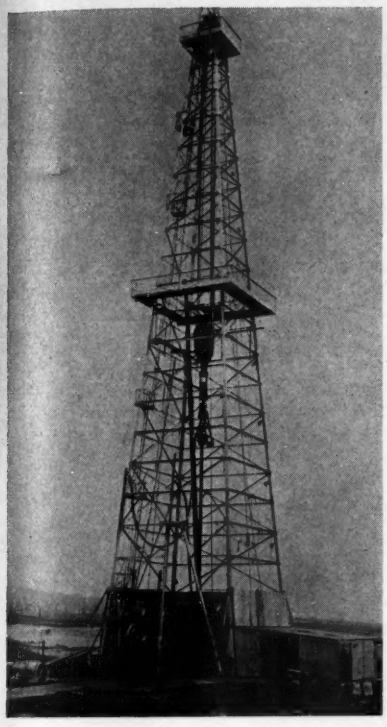
C.N.G.A.

C.N.G.A.

JUNE FROLIC

Introduce New Type Derrick In East Coalinga Extension Field

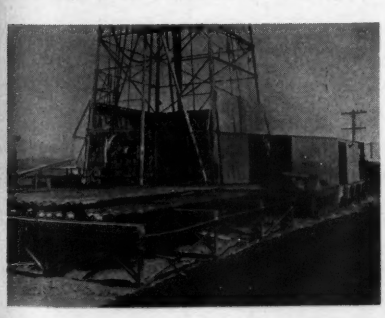
While optimum balancing of weight on bit, drilling fluid volume, and rotary table speed have figured most prominently in recent analyses of increased footage records, an important factor has



been the contributions of the steel derrick builders. The derrick designers have not only permitted the handling of greatly increased loads, but also have made it possible to handle longer and more stands of pipe to speed up operations.

In the phenomenal new East Coalinga Extension field, where an arbitrary potential figure has been set at 6000 barrels daily for each well, a new type of derrick has been introduced by International Derrick and Equipment Co. This new 150-ft. Ideco derrick was especially designed to give additional traveling block clearance at the top for longer stands of pipe when handled with the latest heavy duty elevators, hooks, etc.

The new derrick has a 32-ft. square base which allows adequate working space on the derrick floor, as well as for racking pipe at the finger. The derrick has 7 ft. 3 in. leg extensions and Ideco California type substructure which accommodates either conventional or subderrick floor table drive hookups. A single Ideco welded subbase supports both the drilling engine and the drawworks.



Ideco Steel Pipe Racks and Sectional Type Steel Engine House on new 150-ft. Derrick.

Broderick & Bascom Appoints R. R. Morris for Coast Sales

The appointment of R. R. Morris as Pacific Coast sales representative of

R. R. Morris

Broderick & Bascom's line of Oil Country wire rope, distributed by The Republic Supply Co. of California, succeeding W. Dale Russell, who is returning to The Republic Supply Co. in a special sales capacity, was announced recently by D. Larkin, vice president and general manager of Broderick & Bascom Rope Co. of St. Louis and Seattle.

Broderick & Bascom Rope Co. enjoys the distinction of being the second oldest manufacturer of wire rope in the United States today, having been originally established in St. Louis in 1876, sixty-three years ago.

Their business grew to such proportions that in 1905 it was found advisable to build a factory on the Pacific Coast at Seattle, Washington, in which plant for the past 34 years, all the wire rope sold on the Pacific Coast, both commercial and Oil Country, has been manufactured.

Mr. Morris, their representative, will maintain offices in Los Angeles at 2122 East 7th St.

Republic Supply Appoints Duhig Manager of Sales

Walter L. Duhig has recently been appointed manager of sales for The Republic Supply Co., according to an announcement by J. W. Schmid, vice president in charge of sales.

Walter L. Duhig

Mr. Duhig has been affiliated with The Republic Supply Co. since 1928, entering their employ at the time of the purchase of the Associated Supply Co., with whom he had been connected for a number of years as sales representative in the San Joaquin Valley. Mr. Duhig continued to operate in the Taft area until 1934, at which time he was placed in charge of field store management and personnel, and in 1936 was appointed one of the directors of the company.

Since his appointment in 1934, Mr. Duhig has been active in all California fields through his direction of Republic's fifteen field stores, and has a wide acquaintance with California oil men.

Mr. Duhig will continue to make his headquarters at the main office of The Republic Supply Co. 2122 East 7th St., Los Angeles.

American motorists spent approximately $7,500,000,000—more than 10 per cent of the national income—last year on their automobiles according to statistics compiled by the Bureau of Public Roads.

L A U G H T H I S O F F

Oil men apparently don't rate very highly in the social scale. In the course of a recent fracas in a small hotel not a thousand miles from Los Angeles, a perfectly innocent pumper had a chair smashed over his head. The perpetrator of the dastardly deed was caught shortly thereafter, hauled before the local magistrate, and charged with "wilful destruction of property."

And when a delegation of production men made a joint appeal to the district penal authorities for the release of **Ebenezer Joy,** an Oklahoma driller, they listened carefully to the plea and then pronounced the verdict, "Let Joy be unconfined."

Also, after **Howard Robinson** remonstrated with the fireman a couple of times about letting the boiler pressure slip down too low, the latter, although usually a timid sort of a guy, finally replied with considerable heat.

Which recalls the truck driver who refused to pick up a 1000-pound gauge until he was given a helper.

Says **Charlie Schneider** in astonishment to the land owner, "You have to haul water four miles! Why in the heck don't you drill a water well?" You could have knocked him over with a Baker shoe when the fellow replied nonchalantly, "It's just as far that way."

And **Vivien Washbon** tells about trying out a preacher on one of the Brea district teams. It didn't pan out so well, however, he was always passing the plate.

On the same subject, the fact that the pitcher and the umpire were good friends has often been the cause of a sympathetic strike.

"Gee, this is sure a swell cigar you've given me," said **Roy Fry,** and the equipment salesman piped disgustedly, "Shucks, I'll bet I've given you the wrong one."

Then there was **Jack Carter's** story of the oil man who was so crazy that eventually other oil men began to notice it.

According to **Byron Slater,** the wife of a Long Beach petroleum engineer recently returned from an extended vacation in the east, and is still very indignant over the fact that the pet parrot can now only say two little phrases, "Here's to you, kid," and "Okay, drink 'er down."

And in certain parts of the Valley the water is so bad that the natives boil it, filter it, and then drink beer.

From all accounts, King George and Queen Elizabeth made quite a hit with the folks back east. The whole situation prompts **Oliver Field** to point out that the only royalty we know in the west comes from the oil wells, and it isn't nearly so democratic.

A democrat being a republican who doesn't have very much money.

By the way, in spite of the hot weather, a lot of politicians are suffering badly from exposure at the present time.

Wherewith we diverge with our usual abandon to expound one of **Al Gore's** pet theories. If we are to believe Al, the purchaser of crude oil should not be required to make connections to the tank of the producer. Making such connections, he contends, is definitely a joint responsibility.

You can imagine now the discomfiture of **Shorty Helms** when he sat down in the barber's chair, and the latter confided, "The boss fines me a quarter every time I cut a customer's face, but I don't give a darn today, I won $4 at Hollywood Park yesterday."

That sort of cutting remark is very upsetting to a fellow's equanimity—that is, if he happens to own one, and recalls the tonsorialist who piped to **Herb Dalton,** "Say, I got something that will change the color of your hair overnight." "Well," says Herb, "you've got nothing on me. I have a boy in high school too."

And the gold cure is a fine temporary relief for a case of poverty.

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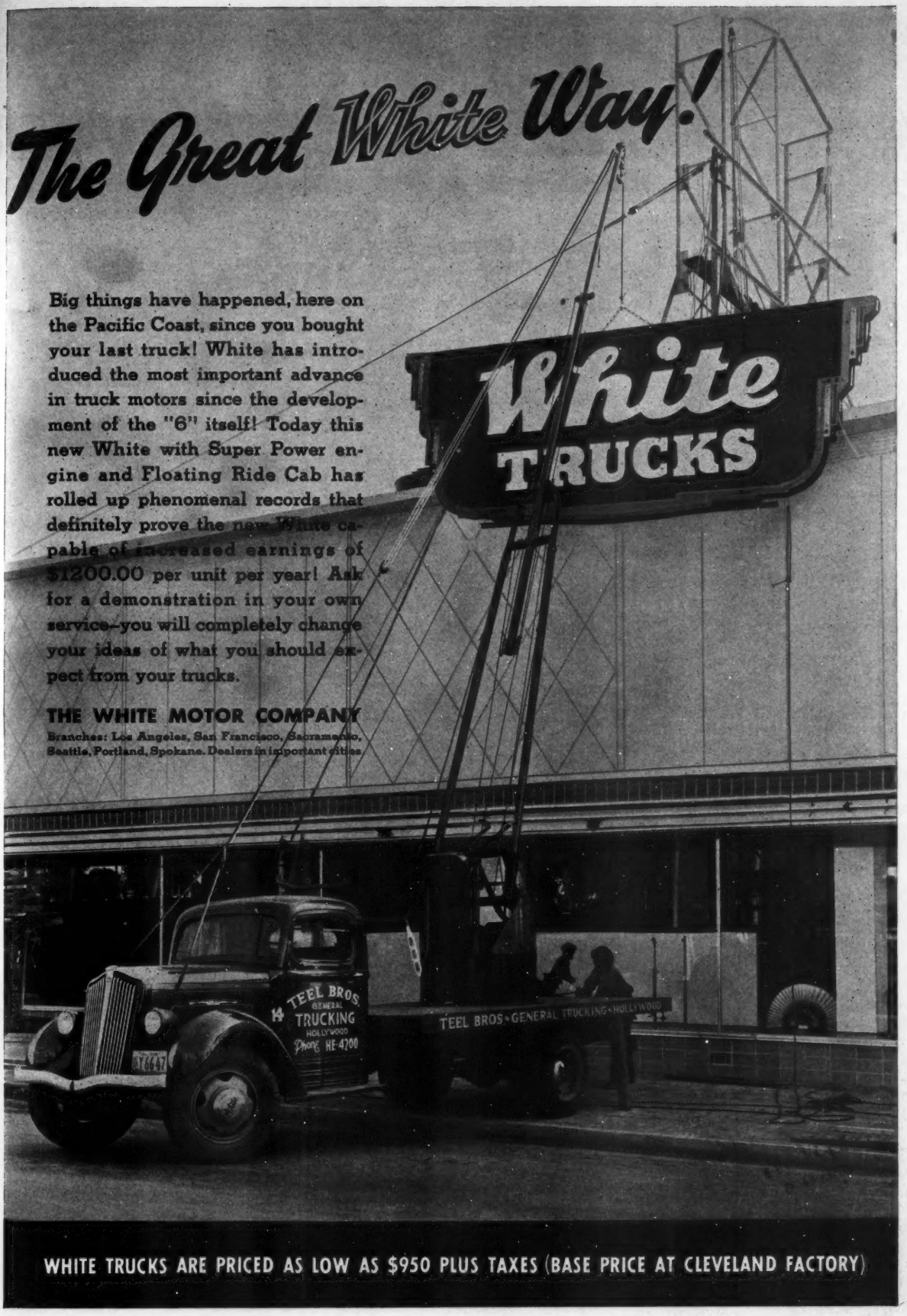
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Field Development

San Joaquin Valley

Wasco Area Joint Test Abandoned

Culminating three months drilling and testing, Kernco No. 1-36, located in sec. 36,27-24, south of the town of Wasco, has been abandoned. Drilled by the Union Oil Co. as a joint test of the Union, Tide Water Associated, Seaboard and Continental Oil companies, the try was carried to a total depth of 12,985 ft.

First showings were gas at the top of the Vedder zone at 12,543 ft. and gray oil stained sand at 12,793 ft. to bottom. Seven inch pipe was then cemented at 12,787 ft. for a production test. Several tests were made at various levels, none of which produced a flow. Swabbing operations produced 119 bbls. of 27 gravity oil in 37 hours, cutting 54% 1000 grain salt water.

Since pumping operations at this depth are out of the question and the oil recovery too little to warrant further work, the project was abandoned June 10.

Out Post Well Extends Cole's Levee Production

Extending Cole's Levee production more than half a mile to the south, Tide Water Associated Oil Co. brought in its KCL No. 61 flowing at the rate of 600 bbls. a day. Bottomed at 10,010 ft., the well penetrated approximately 100 ft. of Stevens zone. Flowing with the hole barefoot below the water string shoe at 9910 ft., the oil is 33 gravity and free of water.

Tide Water Associated Finds Strand Production

Continental - KCL - E - 35 - 7, wildcat drilled by Tide Water Associated Oil Co. in sec. 7,30-26, has been completed in the Stevens zone. Located near the center of the west half of sec. 7,30-26, a mile northeast of the Canal field, the oil sand was encountered at 8310 ft., a point which, if correlated with central and southwesterly Canal producers, indicates a possible continuation of present producing formations.

The potential capacity of the new well and the gravity of the oil coincide with Canal wells too closely to disregard entirely the possibility that the two fields may be directly connected.

The relationship of the new well to existing production parallels exactly the question which arose when the Ohio Oil Co. discovered the Canal field. There

SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
	Fresno County				
Cantua Creek	Shell Oil Co., Port Costa	48–30	30, 17-16	9166	Redrilling
	Superior Oil Co., S.P.L.	1	15, 18-16	5350	Drilling
	The Texas Co., Loeschner	1	12, 17-16	6485	Drilling
Coalinga	Amerada Pet. Corp., SPL	26–17	17, 19-16	7500	Drilling
	Bandini Pet. Co.	48–18	18, 19-16	6720	Drilling
	Rylatt, Harry E., Kipling	3	26, 20-14	2000	Drilling
	Stuart Oil Co.	1	12, 21-14	1410	Testing
	Superior Oil Co., P.V.	1	22, 20-15	8230	Drilling
Fresno Area	Seth Turner	1	4, 14-19		Rig
Gatos Creek	Gatos Creek Oil Co.	1	19, 19-13	150	Rig
	Kern County				
Buena Vista	Gen. Pet. Corp., B.V.A.	1	1, 32-24	4910	Drilling
	Richfield Oil Corp., B.V.A.	81	36, 31-25		Location
	Western Gulf Oil Co., K.C.L., Panhandle	1	3, 32-26	8890	Drilling
Buttonwillow	Calif. Explor. Co., Salisbury	1	7, 29-24	12989	Testing
Devil's Den	Luxton, W. L.	1	27, 25-18	710	Idle
	Emigrant Hill Oil Co.	1	24, 25-18	4280	Fishing
Edison	Siemon, Fred., Metro	1	6, 30-29	4220	Drilling
Elk Hills	Richfield Oil Corp.	A-12-33	33, 30-25	7920	Drilling
	Standard Oil Co.	KCL 21-1	19, 30-25	9178	Drilling
Grapevine	Richfield Oil Corp.	KCL 1	28, 11-20	11004	Testing
	The Petrol Corp.,Reserve-Petrol	33-5	33, 11-19	8946	Redrilling@7007
Greeley	General Pet. Corp., Sullivan	1	12, 29-25	30	Rigging up
Lost Hills	California Lands, Occidental	2	24, 26-20	5623	Idle
Mt. Poso	Wright & Eyer	1	28, 26-28	1512	Testing
Richgrove	Crusaders Pet. Corp., Quinn	1	9, 25-27	1100	Drilling
	Dilamar Oil Corp., Quinn	3	15, 25-27	2902	Testing
San Emigdio	Bannow. Louis E., Irvin	1	15, 10-23	1700	Drilling
	Continental Oil Co.	KCL F-1	5, 10-21	5100	Drilling
	Shell Oil Co.	KCL 2A-52	13, 11-22		Rigging up
Strand	Continental Oil Co.	KCL D-2	14, 30-36	9620	Drilling
	Tide Water Assoc.	KCL-E-35-7	7, 30-26	8364	Completed
Wasco	Getty, George F., Janssen	1	7, 27-24	6350	Drilling
	Union Kernco	1–36	36, 27-24	12985	Abandoned
	Kings County				
Strattford	P. W. Burnham & Assoc., Bartells	1	23, 20-20		Rig
	Tulare County				
Ducor	Amal. Oil & Gas Co., Konda	6	23, 24-27	2072	Abandoned

was then the possibility that what is now known as Canal might have been rather an extension of the Ten Section oil field, a contention which has not to date been definitely settled.

Tide Water Associated spudded the discovery early in April of this year and drilled rapidly to the present bottom of 8364 ft. on May 20. With 46 ft. of oil sand overlying 8 ft. of gray sand on the bottom, the hole was plugged to 8320 where 45 ft. of 6⅝ in. liner including 19 ft. of perforations was landed, the water string being cemented at 8300 ft. Two and one half inch tubing was run to 8200 ft. and the well completed on June 11.

Flowing through a 48/64 in. bean, the well established a 1306 bbl. daily potential of 34 gravity oil cutting 3.3% with 978,000 cu. ft. of gas. Last daily production under curtailed conditions was given as 118 bbls. of 34 gravity oil cutting one percent through a 12/64 in. bean with 39,000 cu. ft. of gas.

The Strand discovery is the second for Tide Water Associated within a year, the company having brought in Porter No. 1 at Aliso Canyon last fall.

Buttonwillow Wildcat Attempts New Test

After a long and expensive series of drilling operations including several formation tests, California Exploration Co.'s Calif. Lands-Dougherty-Salisbury No. 1 located near the town of Buttonwillow, is preparing for another try with a total depth of 12,989 ft. The well has shown many stringers of tight oil sand with low permeability. A formation test at 11,560 ft. yielded some 33.5 gravity oil, yet for the most part the tests have shown but slight tendency to flow at much of a rate and recovery has been chiefly mud and water.

Recently 1363 ft. of 4¾ in. drillable liner was landed at 12,812 ft. of which 148 ft. was perforated. With formation tester set at 11,360 ft. the return was a small flow of mud and water with a little oil. The liner was then drilled up to 12,705 ft. and 149 ft. of 3½ in. blank liner cemented at 12,717 ft. The hole was then cleaned out to 12,740 ft. and the remaining 4¾ in. perforations tested from 12,740-12,812 ft. Swabbed to 9000 ft., fluid which was mostly salt water, entered the hole at the rate of 15 bbls. a day.

Superior Spuds Fresno County Eocene Test

Shooting for another discovery of Eocene production in the area north of Coalinga, the Superior Oil Co. has spudded S.P.L. No. 1. Located six miles northwest of present production, the well is being drilled in sec. 15,18-16. The new Fresno county test was last reported drilling below 6470 ft. in sand and shale.

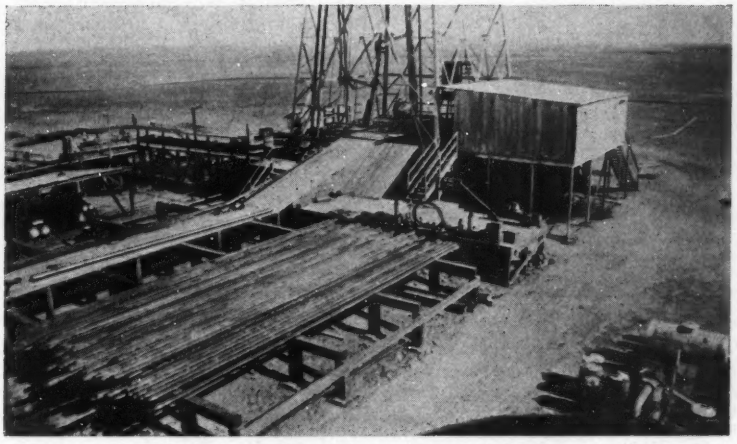
Meanwhile the highly interesting test that the Superior Oil Co. is drilling on Pleasant Valley farm lands, in sec. 22, 20-15, is near the 8350 ft. mark.

The well, known as P.V. No. 1, has been an extremely difficult hole on which to gather accurate data. Being a hole of recognized importance, and with large acreages involved, great secrecy is being maintained.

Rumor has it however that the project topped the Eocene at 7400 ft., the top sands of which were gray. Latest unsubstantiated reports from the Valley state that the well is bottomed at 8351 ft. in shales underlying the Gatchell sands. Whether or not showings have been encountered remains sheer conjecture.

Bandini Extension Test Finds Kreyenhagen Higher

Bandini Petroleum Co. encountered the Kreyenhagen in its extension test well No. 48-18. Top of the marker shale was encountered at 6319 ft., which



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is 681 ft. higher than the Amerada Pet. Corp's S.P.L. No. 7-17, only producer in the area and located but one half mile east of the Bandini project.

The steepness with which the overlying beds rise to the west, lessens in part the optimism with which many have looked forward to eventual production in the Eocene sands. Even if the productive sands are encountered there is a distinct possibility that the beds will be considerably thinned out and will not provide the rich reservoir of oil which has been expected by many leaseholders between present production and the old East Side Coalinga field.

Standard Enters Amerada Area

Entering the play surrounding the Amerada production, the Standard Oil Co. has announced location for a well to be known as No. 73-19B. Located in sec. 19,19-16, on one of the many sections Standard holds in fee, the well will be an offset hole to the Amerada Pet. Corp.'s S.P.L. No. 7-17.

Union Oil Co.'s offset to the same hole, Cook No. 86-18 in sec. 18,19-16, is setting boilers and rigging up rotary equipment.

Fresno County Test Finds Barren Eocene

Shell Oil Co.'s Port Costa No. 48-30, located in sec. 30,17-16, has made a total of 9166 ft. of hole. With oil showings reported at 7065 ft. and 7560 ft. the drill penetrated the top of the barren Eocene formations at 8900 ft. Cores at the bottom of the hole recovered only gray sand. A drill pipe fishing job was abandoned and the fish is now being sidetracked with the redrilling job below the top of the fish at 8845 ft.

Across the township in sec. 12, The Texas Co.'s Loescher No. 1 is drilling below 6483 ft. after finding the top of the McLure shale slightly below the 5900 ft. level.

Earl Price Publishes New San Joaquin Map

Earl M. Price & Co., well known Bakersfield firm, has just published two new maps of the San Joaquin Valley. Each map covers the oil bearing portions of Kern, Kings and Fresno counties, including all oil and gas fields as well as spotting all wildcat well locations. Only difference between the two sheets is the scale and overall size, the smaller being three feet square while the larger is four and a half feet. For clarity, oil fields are colored green, the gas fields are shown in red.

Besides handling a full line of maps, drafting equipment, and conducting a general blueprinting and photocopying business, Earl M. Price handles the popular California Oil World Directory in the Bakersfield area.

Gatos Creek Spuds Try

Located fourteen miles west of the North Coalinga field, in sec. 19,19-13, Gatos Creek Oil Co. has spudded well No. 1. Operating in the northwest quarter of the section, the test will be the first well drilled in this area. Nearest previous activity was in secs. 31-32,20-13, where the Echo Oil Co. drilled several shallow holes without production.

Lufkin's Ed Layton On Trip to Venezuela

E. N. Layton, Bakersfield representative for Lufkin Foundry & Machine Co. has taken leave of absence to assist the engineering staff of the Venezuela Oil Co. in some special work with which he is familiar.

His work in the Valley will be handled by Bob Casson and Bob Spaulding.

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Los Angeles Basin

Wilmington Output Low Despite Completions

Despite the many recent completions in the Wilmington field, total production is now held down to the lowest figure in many months. For the week ending June 10, the field average was 80,002 bbls. daily, an excess of only 4555 bbls. over the Umpire's allowable. During this period, Wilmington slipped from its long-held position of being the State's worst offender to fifth place behind Kettleman Hills, Ventura Avenue and West Montebello whose overages were 8767 bbls., 7206 bbls. and 7030 bbls. respectively, and Huntington Beach which was 5162 bbls. over. The fact that the low total was for a period during which a number of new wells were completed is concrete evidence of the willingness and ability of operators to voluntarily curtail in a competitively drilled field.

Most extensive operations in the field at the present time are those of Long Beach Oil Development Co. on properties of the City of Long Beach. Six more Terminal zone wells were brought in by the company on the "X" and "Y" parcels between the harbor entrance channel and the Navy Landing.

Another good well was obtained by Signal Oil & Gas Co. in S. P. No. 1, whipstocked beneath the harbor channel from the General Petroleum Corp. S. P. lease. The City of Long Beach and Long Beach Dock & Terminal Co. share the royalty on the Signal channel wells.

Perhaps the most interesting of recent Wilmington completions is that of Petroleum Midway Co. north of Anaheim and west of Hayes. Bottomed at 3468 ft., and with 282 ft. open below the water string, the production is claimed by President Kupfer to be 290 bbls. a day flowing through a 40/64 in. bean. If the well proves to be no fluke, it will undoubtedly stimulate new drilling in this section of the field.

Good Ranger zone completions were obtained by independent operators at opposite ends of the field. At the intersection of "L" and Marine Sts. in the northwest end of the Wilmington townlot area, Macson Oil Co. finished its No. G-55-3 with initial production of 650 bbls. a day. An 8⅝ in. water string was cemented at 2845 ft. and a "pre-pack" perforated liner was landed on bottom at 3670 ft. Near the field's easterly boundary, north of Seventh St. and west of Pico, Bond Petroleum Corp. No. 3 was bottomed at 3245 ft. and with 320 ft. of "pre-pack" perforated pipe was completed with initial production estimated at 250 bbls. a day.

At the southwest corner of "I" St. and MacFarland, Sunray Oil Co. deepened Santa Fe A-1 to the Ford zone obtaining an initial yield of 420 bbls. of 30 gravity clean oil. Perforations are open in the upper portion of the zone from 5313 to 5350 ft. and from 5535 to 5545 ft. while the Lower Ford is open from 5550 ft. to bottom at 5717 ft. The upper intervals were gun perforated after cementing through perforations at 5628 ft.

Determined to get its share of the Long Beach harbor oil, Los Angeles County is preparing to take legal steps towards drilling the flood control channel, the west bank of which is the easterly boundary of the field according to Long Beach City ordinance. A lease on the channel south of Anaheim Blvd. is held by Continental Corp.

Court Order Forces Montebello Curtailment

One of the few instances of curtailment under law in California came into being during the past week when a court order temporarily set the maximum legal production per well at 250 bbls. in the West Montebello field. The order was issued at the request of State Oil & Gas Supervisor R. D. Bush on the ground that it was the only practicable way to conserve the tremendous quantity of gas which was being blown to the air. The newly developed lower Seventh zone has an unusually high gas-oil ratio, the wells completed in this zone averaging about 5000 cu. ft. of gas per barrel of oil lifted.

Five wells were recently completed, all in the lower section of the Seventh zone. In the Maple Avenue sector, the Brookline Oil Co. well was deepened by La Merced Drilling Co. to 7630 ft. where it was completed with a flow of 700 bbls. and 3,000,000 cu. ft. of gas. North of the Brookline well, Montebello Reservoir Oil Co. carried its No. 2 well to 7612 ft., completing with an initial estimated at 650 bbls. of oil and nearly 7,000,000 cu. ft. of gas.

South of Beverly Blvd. and west of Maple Ave., Hathaway Oil Co. probably started a new drilling boom by proving the deep horizon very prolific in this location. Bottomed at 7662 ft. the well came in at the rate of 110 bbls. per hour. Across the street to the north, Stanley Oil Co. finished its No. 1 with the initial rate estimated at 2000 bbls. a day.

Vulcan Oil Co., located at the corner of Sixth St. and Beverly Blvd., deepened to 7648 ft. and completed flowing 1000 bbls. a day. The well formerly produced from the lower Sixth zone.

Because of the large amount of gas produced by lower Seventh zone wells, the gravity of the oil averages 50 degrees (A.P.I.), the highest produced in any Los Angeles Basin field with the exception of Potrero. Water has not yet become a factor in the deep wells the only one reported wet being Union's La Merced No. 30 which discovered the zone but also apparently encountered a fault.

Activity in the field is now at its highest point, eighteen months after the discovery of the Sixth zone by St. Helens Petroleum Co.'s Monterey No. 20, a recent count indicating 36 active projects. At least another half dozen operators are planning to enter the field immediately.

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Castaic	Lang, Ed. W., Rupy	1	7, 5-16	90	Drilling
Inglewood	Vanguard Oil Co., L.A.I.	1	29, 2-14		Rig
Mint Canyon	Redwood Oil Co., Mitchell	1	22, 4-15	100	Drilling
Montebello, West	Ridge Oil Co., Sea Cliff	1	3, 2-12	7306	Drilling
Newhall	Mangrum and Page, Lintz	1	4, 3-15	352	Idle
Palos Verdes	Rolling Hills Pet.	1	27, 4-14	5385	Cleaning out
Playa del Rey	Empire Oil Co., Samarkand	1	34, 2-15	6413	Testing
Puente	Stabeck & Assoc.	1	14, 2-10		Rig
San Pedro	Sepulveda Oil Co.	1	23, 5-14	650	Cleaning out
Sunland	South Alta Oil Co.	1	1, 2-15		Rig
Towsley Canyon	J. E. O'Donnell	1	8, 3-16	5150	Drilling
Whittier	C. W. Partridge, Hillside	1	22, 2-11	1780	Idle
	Taylor Drlg. & Prod. Co., Gregg	1	17, 2-11	5010	Drilling
	Vulcan Oil Co., Drake	1	17, 2-11		Location
	Orange County				
Costa Mesa	A. V. Oil & Gas Co.	1	16, 6-10	4751	Idle
Dana Pt.	Dana Point Oil Assoc.	1	15, 3-8		Cellar
	San Bernardino				
Carbon Canyon	Carbon Canyon Oil Co.	1	30, 2-8	200	Drilling
	John Hokom Oil & Gas Co., Ltd.	1	31, 2-8	350	Drilling

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Texas Completes Torrance Well

Initialling 210 bbls. of 29 gravity oil, The Texas Co.'s Oakley No. 6 was completed at 5241 ft. For the first time since the discovery of the area last summer the company has not announced the location of a new project before each completion.

Barnsdall Drills Two Rcho. San Francisco Wells

For the first time in the two year history of the Newhall-Potrero field, there are two wells drilling at the same time. With five good wells already on production, Barnsdall Oil Co. has spudded two more, both of which are drilling near the 4000 ft. level.

Petromont Spuds Five Points Well

Despite the failure of Thompson & Geiske to obtain more than a trace of oil in the Dragon well, Petromont Oil Corp. has started the drill in its No. 1 well offsetting the J. E. F. Oil Co. Bruce No. 1 producer in the Huntington Beach Five Points area. The new project is expected to find production as it is only a stone's throw from one of the three pumpers in the tiny field.

Within the old field, William Brayton is redrilling his Johnson No. 1A after plugging to 2632 ft. It is planned to recomplete at about the 3200 ft. level.

Towsley Well Below 5100 Ft.

J. E. O'Donnell's Towsley Canyon wildcat is currently rumored to be coring shale with thin streaks of oil sand below 5100 ft.

Jerman Starts 2nd Deep Signal Hill Well

Choosing as a drill site the northeast corner of 25th St. and Gaviota Ave., R. W. (Rocky) Jerman is preparing to drill another deep well in the old Signal Hill field. The location is about two blocks east of and higher structurally than De Soto Oil Co. No. 1, completed by Mr. Jerman last December at 10,157 ft. flowing 350 bbls. a day on gas lift. Associated in the new company, which will be called Dormax Oil Co., are many of the industry's most prominent names.

Whittier Deep Well Drills Below 4700 Ft.

Last reported below 4700 ft. in depth is Colorado Oil Co.'s deep test of the old Whittier field. The well seeks production from the lower Miocene series.

West of the old Rideout Heights area, the Greggfield well is resuming operations after a week's shutdown at 5018 ft. The hole is contracted to Taylor Drilling & Producing Co. of Long Beach.

Coyote Well Sets 427 Bbl. Potential

After perforating the additional interval 4180-4300 ft., Bartholomae Oil Corp.'s latest completion, Stern No. 8, established a 427 bbl. a day potential. The well had previously been producing 220 bbls. a day from 4300 to 4340 ft.

West of the Bartholomae outpost, Exeter Oil Co. is reported planning to drill a semi-wildcat in the hope of still further extending the old East Coyote field.

Rolling Hills Deepens Palos Verdes Test

Terminating several months idleness, Rolling Hills Petroleum Co. is cleaning out its Palos Verdes fault test with the avowed intention of deepening a couple of hundred feet. The hole, which is 5385 ft. in depth, is cased to 5001 ft. The project is located south of Highway No. 101 west of the town of Lomita.

Near the summit of Palos Verdes, Sepulveda Oil Co. is preparing to continue the well suspended months ago by R. T. Grady at 600 ft.

Tide Water Is Lone Aliso Canyon Operator

The recent abandonments of the Standard Oil Co. and Union Oil Co. northerly edge wells leave Tide Water Associated Oil Co. the lone operating company in the Aliso Canyon field. With formations reported as shale with occasional sand streaks, the only drilling well, Porter No. 11, is drilling below 3150 ft.

Empire Pumps Del Rey Well

Unable to complete Samarkand No. 1 as a flowing well, Empire Oil Co. has placed the project on the beam with no estimates yet available on the yield. The hole, finished at 6413 ft. in the basement schist with a 7 in. water string cemented at 6215 ft. in the Nodular shale, is at the edge of the Playa del Rey field.

Late Valley

General Pet. Corp. Will Drill Greeley Outpost

General Petroleum Corp. has taken over the Pacific Western Oil Corp. Sul-

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In order to more efficiently meet the needs of California oil men, Bowen's Santa Fe Springs branch has been made the central warehouse and distributing point for Bowen Oil Tools.

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During its 14 years at Santa Fe Springs, this branch has taken an extremely active part in the development of the fields in this territory. Today it is the largest of Bowen's six strategically located service branches.

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J. H. (JACK) WILCOX

heads the servicing of Bowen Tools both in the state as well as out. He started learning the oil business at Coalinga in 1912 with the Kern Trading & Oil Co. under Bill Keck, Charley Hively, Roy Fry and R. D. Bush, and has been at it ever since except for the time he served in the War. In 1921, Jack was employed as contact and service man with the Bowen Company at Huntington Beach. Today he is Vice-President and Sales Manager of the S. R. Bowen Company, and President of the Valley Fishing Tool Company (a subsidiary of the S. R. Bowen Company) and has been largely responsible for building the Bowen Service Organization to its present high efficiency.

Ready to serve you at Santa Fe Springs

Here are the men at Bowen's Santa Fe Springs Branch who, day and night, stand ready to set the wheels in motion on the swiftest, most dependable fishing tool service in California: Dick Hendricks, Store Manager; Ed Bynum, Service Man; Charles Saladin, Storekeeper; Ed Weeks, Storekeeper; Dan Archibald, Transportation Mechanic; Frank Nolan, Delivery Man; Pop Smeaton, Delivery Man and Al Cusolito, Delivery Man.

WHERE THERE'S A WELL, THERE'S A WAY—*CALL BOWEN*

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livan lease in sec. 12,29-25. A technical spud for the well to be known as Sullivan No. 1 was made on June 12. The project is located near the east quarter corner of the section, on the property described as the north half of the southeast quarter of section 12.

Heavy equipment will be rigged up at once for the test. Located as it is midway between the Greeley and Rio Bravo fields the try will provide opportunity to determine the productivity of an area long suspected to be oil bearing.

Standard Completes Trico Gas Well

Standard Oil Co. completed Tulare Farms No. 2-1 for an estimated 20,000,000 cu. ft. of gas daily. Located in sec. 35,24-23, the well is bottomed at 2444 ft. The gas production was obtained from the bottom 30 ft. of the hole. After a 45 minute flow through a 55/64 in. casing bean, the well was shut in with pressures on the tubing and casing even at 1046 lbs.

Standard, the only active operator in the gas field, is preparing to spud Tulare Farms No. 2-2. This project lies in the west half of sec. 34,24-23. Locations have been made for Nos. 3 and 4.

Two Wells Drill At Carbon Canyon

Two wells have recently spudded in the Carbon Canyon area of San Bernardino County. John Hokom Oil & Gasoline Co., Ltd. is drilling Hokom No. 1 below 300 ft. in sec. 31,2s-8w, while in sec. 30, Carbon Canyon Oil Co. has made about 100 ft. of hole on the Schuh lease.

Wheeler Ridge Deep Test Stdg. Cemented

With safety first as a watchword the Richfield Oil Corp. has decided to let KCL No. 1, sec. 28,11-20, stand cemented until there can be no doubt that the job has properly set. While many interested persons await the outcome of production tests on the hole, Richfield engineers with the aid of temperature recording devices, maintain that the 6⅝ in. pipe cemented at 10,815 ft. should have plenty of time to harden.

Coastal District

Union Oil Obtains Santa Maria Producer

With the completion of Frank Vicente No. 5 at better than 1100 bbls. a day, Santa Maria Valley is again without a drilling well. The new producer, drilled by Union Oil Co., was bottomed in Franciscan at 5279 ft., and was completed with 450 ft. of perforations open in the Monterey. The Frank Vicente lease is located in sec. 21,10-34.

Richfield Plans 2nd San Marcos Well

With San Marcos No. 1 bottomed in Temblor shale at 1961 ft., Richfield Oil Corp. is planning to drill a second well 220 ft. to the south. Unconfirmed reports were persistent to the effect that good oil showings though nothing commercial, were found in the first well. Some difficulty was experienced with caving formations. Both wells are located in sec. 20,6-29.

Speik Oil Deepens Sespe Producer

Speik Oil Co., headed by Dr. Frederick Speik, is deepening its Sespe well, Chappuis No. 1. Formerly bottomed at 3635 ft. in Sespe, the well produced intermittantly at rates variously estimated from 15 to 50 bbls. a day. Present plans call for deepening to 4000 ft.

Petrol Finishes Gato Ridge Well

Producing initially in excess of 600 bbls. a day, The Petrol Corp. recently brought in Tognazzini No. 32-B at Gato Ridge. The hole was bottomed at 3100 ft. and 10¾ in. casing was cemented at 2180 ft. leaving open to production 920 ft. of the Monterey brown shales. Last curtailed production reported was 320 bbls. daily of 14 gravity clean crude flowing through a one inch orifice under 250 lbs. per square inch.

Lloyd Corp. Starts New Avenue Well

Following the surprise completion of its No. 2 well, Lloyd Corp. announced the location for No. 3 approximately 1100 ft. to the east. No. 2, which came in while circulating oil to loosen stuck drill pipe, is pinched in as far as safety permits but is yet flowing over 1000 bbls. a day of 32 gravity oil through a 25/64 in. bean. The flow is through the casing around the drill pipe and kelly which is packed off at the surface.

British American Oil Producing Co., which lately finished its first Ventura try to obtain its first California production, has started work on Hartman No. 8.

HOWARD SUPPLY

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O. C. Field Deepening in Monterey Shale

O. C. Field is deepening his Corporation No. 1, wildcat well in sec. 21,9-33, in Monterey shale after cementing a protection string of 7⅝ in. casing at 6152 ft. Now below 6200 ft., the hole will be carried down in search of production similar to that found by Standard Oil Co. in Las Flores Land & Oil Co. No. 1 a mile and a half to the southeast. The latter well was completed at the plugged depth of 6440 ft. pumping and flowing 800 bbls. a day of 15 gravity clean oil. The Monterey was topped at approximately 5400 ft., nearly 600 ft. higher than in the Field project.

Shiells Canyon Wells Disappoint

Recent reports on Shiells Canyon wells have generally been disappointing. El Rancho Oil Co.'s Elkins No. 3 is drilling below 3750 ft. with but little in the way of encouragement. A formation test of the interval 3445-3475 ft. is said to have recovered only mud with a trace of oil.

Finding only poor oil sand to 3272 ft., The Texas Co. plugged Shiells No. 137 back to 900 ft. and is now redrilling in an effort to kick the hole up structure.

Galveston Oil Co.'s Basola No. 1, located in sec. 5,3-19, is standing idle after running an electric log to bottom at 3140 ft. The well encountered poor oil sands at 2600 and 2900 ft.

English Testing Hopper Canyon Well

J. A. English's Lankershim No. 2, sec. 13,4-19 in the Hopper Canyon area, is preparing to make a production test after bottoming at 2500 ft. in oil sand topped at approximately 2250 ft. A liner was cemented in the hole at 1600 ft.

General Pet. Redrilling More No. 4 in Goleta Area

After finding Vaqueros sands barren to 4757 ft. in the first hole, General Petroleum Corp. plugged More No. 4 to 614 ft. and is directionally redrilling below 2500 ft. The project is seeking commercial oil or gas at the edge of the Goleta gas area on the coast of Santa Barbara county.

Monterey County Defeats The Texas Co.

Monterey county, which has repulsed advances by scores of companies, again set The Texas Co. in its place. The company's Arroyo Seco No. 1, located in sec. 11,19-5, found only the meagerest showings to 4265 ft. where it was abandoned. Much difficulty was encountered in maintaining circulation during the drilling.

Trans-Oceanic Spuds Third Mesa Project

Demonstrating its faith in the Santa Barbara Mesa field, Trans-Oceanic Oil Corp. has spudded in its M'divani No. 3 near the northeast corner of the Lowe property. The company's previous attempts have been rewarded with small but commercial production.

Hogan Spuds New Zabala Test Well

At a site only 10 ft. south of the abandoned No. 1 core hole, Hogan Petroleum Co. has spudded in its deep test well, Zabala No. 1. Located in sec. 33,9-34, the project was last reported in Sisquoc at 1225 ft. The hole has surface casing cemented at 300 ft.

Topeka Tests State Permit

On a formation test of the interval 1650 to 1767 ft. in Tideland Permit No. 17-1, Topeka Oil Co. recovered only a stand or two of mud showing a little oil. Last reports said the well was being deepened at 1770 ft. in Sespe sands and shales.

Court Ruling Adds New Petroleum Tax

A decision of the Fifth United States Circuit Court of Appeals on June 7 in New Orleans gave the Government an opportunity to collect $6,000,000 in taxes from oil companies throughout the country. The court held that movement of petroleum products from storage tanks of a refinery to vessels at the wharf at the refinery site constituted transportation by pipe line within the meaning of the tax statute and Treasury regulations and was taxable as such. The ruling upheld the Federal District Court's decision.

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Merced	Stone, Elmer B.	1	8, 12-11	1980	Abandoned
Monterey	The Texas Co., Arroyo Seco	1	11, 19-15	4265	Abandoned
Solano	Standard Oil Co., C.P.C.	1	15, 5-2	4900	Drilling
Sutter	Buttes Oilfields, Inc.	5	1, 15-1	4325	Drilling

COASTAL COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
Santa Barbara County					
Bicknell Area	Hogan Pet. Co., Zabala	1	33, 9-34	1204	Drilling
Capitan	Litho Oil Co., Rhode I.	1	4, 4-30	3015	Idle
Carreaga	Barbara Pacific Oil Co.	A-A 2	8, 8-33	6820	Idle
Foxen Canyon	Richfield Oil Corp., Tinaquaic	1	36, 9-32	5541	Idle
Gato Ridge	The Petrol Corp., Tog.	32-B	9, 8-32	3100	Completed
Goleta Gas Area	Gen. Pet. Corp., More	4	15, 4-25	4757	Redrilling
Guadalupe	Cole, Fred	Ferrini 1	15, 10-35	4700	Idle
Orcutt	O. C. Field Gas. Corp.	1	21, 9-33	6250	Drilling
	So. Calif. Drlg. Co., Houck	1	9, 9-33	5002	Idle
Lompoc	Sun-Bell Oil Co.	1	28, 8-34		Foundation
Los Olivos	United Western Oil Co.	1	15, 7-30	3885	Drilling
San Marcos	Richfield O. Corp., San Marcos	1	20, 6-29	1961	Idle
Summerland	Glenray Oil Co., Glenray	1	1, 4-26	90	Idle
	Oil Group, Inc., Hyland	1	16, 4-26	1315	Idle
	Topeka Oil Co.	17–1	22, 4-26	1775	Drilling
San Luis Obispo County					
Elk Horn	Calif. Pet. Prod., Irons	1	19, 10-24	2265	Cleaning out
	Newton, S. M., Stafford	1	18, 31-21	3075	Drilling
	Temblor Oil Co.	1	22, 31-21	3465	Idle
Paso Robles	Epco, Inc.	1	27, 26-13	5575	Idle
Ventura County					
Red Mountain	Martin, J. W.	3	15, 4-21	1775	Drilling
Sespe	English, J. A.	2	13, 4-19	2500	Testing
	Nevada-Fortuna Oil Co.	1	13, 4-19		Rig
	Speik Oil Co.	1	33, 5-19	3720	Drilling
Shiells Canyon	Galveston Oil Co.	1	5, 3-19	3140	Idle
	Shomy Oil Co., Shomy	1	32, 4-19	825	Idle
Simi	Levesque, G. M.	1	17, 2-18	2210	Idle
Tar Creek	Section 20 Oil Co.	1	20, 5-19	2900	Drilling
Ventura	Ventura Explor. Co., Sexton	1	30, 3-22	9511	Abandoned

(Continued from Page 24)

argument applies that the selective characteristic is sufficiently desirable to offset the undesirability of distortion.

The time of explosition of the dynamite must also be shown on the record; it is usually called the "time break." At one time it was thought desirable to wrap a wire around the dynamite and record the moment at which a small current ceased to flow through the wire by reason of its rupture by the exploding dynamite. This system has the advantage of positive relation to the explosion. At present electric blasting caps are sufficiently uniform in their characteristics, and the moment of rupture of the firing circuit within the blasting cap is considered to indicate the time at which the explosion started. The time break may be recorded on one of the channels, which also records from a geophone circuit, if proper means are taken to eliminate the effect of the firing circuit by the time that the geophone begins to produce its signal. Hand-operated electrical generators (called "blasters") are usually used to fire the cap, their selection being for reasons of safety. A battery-operated circuit may also be used and has certain advantages of reliability in recording the time break under adverse conditions as compared to the blaster method.

J. D. Hardcastle Dies Following Operation

J. D. Hardcastle, vice president of Spang-Chalfant, Inc., died June 12 in

J. D. Hardcastle

Cedars of Lebanon Hospital, Hollywood, following an emergency operation.

One of the oldest employes of Spang-Chalfant Co. in point of service, Mr. Hardcastle had been identified with the company for 35 years. He was a member of the Duquesne Club and the Oakmont Country Club.

He leaves a widow; two daughters, Dorothy Hardcastle of Pittsburgh, Mrs. James L. Barngrove of New Haven, Conn.; two sons, J. D. Hardcastle, Jr. of San Francisco and Jerome C. Hardcastle of Houston; a sister, Mrs. D. L. Schafer of Carrolton; a brother, W. A. Hardcastle of St. Louis.

Walter F. Perkins On Koppers Board

Walter F. Perkins, vice president of Koppers Co. in charge of its Baltimore operations, has been elected a member of the board of directors of Koppers Co.

Mr. Perkins joined the former Bartlett Hayward Co. in 1915 as an assistant superintendent. He was general superintendent in 1927 when he went to the Worthington Pump and Machinery Corp., Harrison, N. J., as works manager. He returned to Bartlett Hayward in 1932 as vice president and general manager. He later became president, a position which he held until the company, a subsidiary, was absorbed as a division of Koppers Co. in 1936. He has been vice president of Koppers Co. since that time and is in charge of the Bartlett Hayward and American Hammered Piston Ring divisions, and The Maryland Drydock Co.

Fletcher Oil Co. Plans Cracking, Poly. Plants

Fletcher Oil Co., Inc., 530 W. Sixth St., Los Angeles is building a single-coil Dubbs cracking unit and a non-selective U.O.P. catalytic polymerization unit near Wilmington, Calif.

The cracking unit has a rated capacity of 1100 barrels a day of gas oil or 1700 barrels a day of fuel oil. The polymerization unit has a rated capacity of 500,000 cubic feet of gas per day. Both units are designed to allow for future increase in capacity.

The company is going to great lengths to prevent corrosion. Chrome moly tubes are used in the heater and the principal piping and valves. The reaction chamber and flash chamber will be lined with corrosion-resisting alloy, as well as the lower section of the fractionating column.

The hot oil pump will have chrome alloy metal block and stainless steel plungers.

The Fluor Corp., Ltd. is the contractor. Universal designed the unit and furnished the specifications. Fluor furnished the drawings and is handling the construction.

Petroleum Accountants Elect 1939 Officers

Results of the election of officers and directors of the Petroleum Accountants Society of Los Angeles for the coming fiscal year have just been announced. Louis A. Williford, Macmillan Petroleum Corp., is the new president; Wil-

Louis A. Williford

liam A. Russell, Seaboard Oil Co. of Delaware, and Dwight A. Moore, Wilshire Oil Co., are the new vice-presidents; and Irving J. Hancock, Union Oil Co. of Calif., is secretary-treasurer. Of the three directors, Irving J. Hancock, Union Oil Co., and Charles K. Slack, General Petroleum Corp., were re-elected, and Stanley J. Anderson, Ring Oil Co., was elected to replace D. S. Kilgour, California Oil and Gas Association, retiring president.

Mr. Williford, the new president, has been active in accounting work since 1920. After education at both the University of Illinois and Indiana University, he joined the regular army in 1917, serving as both lieutenant and captain and resigning in 1920. From 1920 to 1922 he was cost accountant with the Busch-Sulzer Brothers Diesel Engine Co., St. Louis; from 1922 to 1923 he was an accountant with Price, Waterhouse & Co., Los Angeles; from 1923 to 1929 he was chief accountant and auditor with The Petroleum Co., Los Angeles; and from 1929 to the present he has been with the Macmillan corporation, since 1930 as accounting manager and tax man. He is a member of Delta Upsilon fraternity and has been a director of the Petroleum Accountants Society for five years.

You are reading the Pacific Coast oil men's home paper.

Solons Declare for State Oil Control

Bill Awaits Governor's Signature

Once again the California oil industry faces the prospect of operating under state control, and once again rumors of a referendum on the control law are prevalent. The Atkinson bill, subject of the bitterest fight of the over-long session of the State Legislature, was finally passed by the State Senate by 27 to 10 on June 19, after having passed the State Assembly 44 to 28 a couple of days before.

The Governor has said that he would sign the bill—in one of his recent Sunday night radio broadcasts, he pleaded for the bill, saying that control of the oil industry was necessary if the economy of the state is to be protected.

Opponents of the bill announced at the hearing held by the Senate Oil Industries Committee that if it were passed, and the governor signed it, they would immediately start referendum proceedings, and at least one rumor—unsubstantiated—says that the necessary funds are on deposit, and that they have been ready for the past couple of months.

If the necessary number of certified signatures is obtained on petitions, the bill will not become an effective law until it has been voted on by the people at the next statewide election, which may mean that it will be held in suspense until the presidential elections of 1940, but probably means that it will be on the same special election ballot that the governor has promised the "ham and eggers."

The bill itself, as amended and finally passed by the Legislature, differs considerably from the bill introduced last January. It now sets up a commission of three: the Director of Natural Resources, the Director of Finance, and the Director of Public Works, with the first named as chairman of the commission. The latter two receive no additional compensation because of their service as commissioners, but the Director of Natural Resources as chairman, will get an additional $4000 per year.

This commission is empowered to set up an allowable for each well in the state, and is given the necessary authority to see that the allowable thus set up is conformed to by the operator. Production over the allowable is declared to be "illegal" oil, and is subject to seizure and sale by the state, the funds derived from such sales being deposited to the account of the general fund of the state. In addition, the overproducing operator is subject to a fine of $500 for each day his overproduction continues.

Provision is made for the commission to obtain the necessary records to indicate whether the operator is overproducing or not, the commission being given subpoena powers, and being given the right to require all pertinent information from the company in question.

The Division of Oil and Gas is abolished by the new law, but its personnel and functions are set up under the commission, and will probably continue very much as they have been in the past.

An interesting section of the law, reportedly placed in it in response to insistent demand by the Governor, requires the commission to make a complete investigation of the oil industry. This section reads:

"Sec. 20.5. It shall be the duty of the commission to investigate and collect complete data with reference to present and potential production and the extent of oil and gas resources in the State; methods of drilling and production operation; methods of transportation of oil and gas and their products; methods of refining and of marketing and distributing oil and gas and their products; the extent and service given by existing pipe line and other oil and gas transportation facilities; prices at which oil and gas and their products are sold to consumers; and generally all facts and matters material to the conservation, and to the general public interest in the production, distribution and consumption of oil and gas and their products. For the purpose of further carrying out the general public policy set forth in section 1 of this act (to regulate and stabilize the production and distribution of petroleum oil and natural gas) the commission shall make a report to the Governor and to the Legislature of its findings material to the consideration of further legislation for carrying out said policy."

The controversial subject within the industry, whether or not there should be transfers of allowables, is no longer specifically mentioned in the bill. This subject has been in and out of the act as it has been amended from time to time, but as it was passed by the Legislature, the bill makes no mention of the subject directly. However, it is thought that an interpretation of the act would indicate that transfers of allowables are prohibited, because one clause in the bill requires each well to be separately considered for the purpose of determining its production quota.

Another matter of considerable discussion in earlier hearings when the bill was first being considered by committees, was the position of the stripper well. As the act now stands, this type of well seems to have adequate protection in two ways. First, the law prohibits curtailment or proration of a well in such a way as to cause premature abandonment of that well, and second, it prohibits the curtailment of a well below 25 barrels per day.

Opinion within the industry seems to be about evenly divided as to the merits of and need for the bill. While opponents have generally been bitter in their charges that the bill is monopolistic, that it is ruinous to the smaller operators, and that there is no need for such a law in view of the fact that the Umpire has been successful in prorating California production, proponents have said that state regulation of production is essential if the California industry is to be saved from collapse, that rather than being monopolistic, the bill actually will insure a "living wage" for each operator, and that the voluntary proration program has not been able to prevent the piling up of from 35 to 40 million additional barrels of oil in storage during the past year or year and a half.

The difference of opinion within the industry led to some of the most controversial committee hearings and meetings held on any bill during the present session of the Legislature.

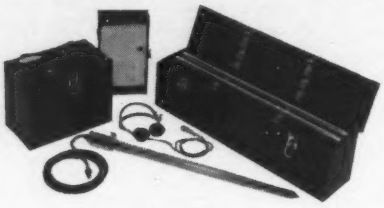
Rosecrans Outpost Tests Water Shut Off

With much interest, the entire Los Angeles Basin oil industry is awaiting the outcome of tests now being made in the Howard Oil Associates well located on Compton Blvd. south of the Rosecrans field. Bottomed in oil sand at 7644 ft., the first production test was decidedly wet and the liner was pulled and the shoe of the water string recemented at 7552 ft. The recement job is now being tested, and if an "OK" is received, the hole will be cleaned out to bottom for another flow test. By mistake, the casing was cemented 30 ft. higher than was intended, leaving a questionable appearing gray sand below the pipe. Some observers are of the opinion that it may be necessary to cement the liner through perforations above the top of the oil sand at 7604 ft. before a clean well will be obtained.

Not waiting for completion of the discovery well, King & Weymouth are drilling Averill No. 2 below 3700 ft.

Vibration Differentiation For Pipe Leak Detection

Described and illustrated in Western Instrument Co.'s new catalog is a practical, successful method of testing pipe lines for leaks—"The Vibration Differentiation Method"—based on accepted principles of physics. This new solution



of a common problem attains a high degree of accuracy through the use of the Western Instrument Co.'s exclusive equipment. The Vibration Differentiation Method as used with Western Instrument equipment is the result of years of experimentation and research.

The vibration in a pipe line caused by gas, steam, air, water, oil and other fluids escaping under pressure is resolved into two components: one, the longitudinal, being parallel to the axis of the pipe, and the other transverse, being normal to the axis of the pipe. Quantitative inspection of the effect of selective damping with respect to frequency, and of the relation between these components, furnishes indications from which the source of the vibrations may be determined.

Considering the difficulties attending any attempt to interpret vibrations in a pipe line, it may be readily seen that a specially designed instrument, which has certain fundamental requirements, is necessary for the work.

First, a pickup for vibrations which must have differentiating characteristics and respond with high sensitivity to the range of frequencies which the leak produces.

Second, means must be provided for filtering vibrations picked up in order to analyze the vibrations originating at the leak and rejecting those originating elsewhere.

Third, due to the extremely small energy of vibrations at distances from the leak, a powerful amplifier, efficient for the frequencies used, must be employed.

Fourth, a simple and convenient meter must indicate the result.

Finally, it is desirable that the complete instrument be compact, portable and give the consistent, trouble-free service to be expected from efficient industrial apparatus.

H. E. "Eddie" Thompson To Houston for Security, Inc.

The Security Engineering Co., has announced the transfer of H. E. "Eddie" Thompson to their new plant at Houston, Texas, where he will represent the company in the sale of "Securaloy," Security Drillable Products, the Sievers Reamer and the other well-known items of oil field equipment manufactured by Security.

Mr. Thompson has had widespread experience in oil field work, both in domestic and foreign fields. He spent eight years in South America where he

Eddie Thompson

was the equipment engineer for the drilling and production departments of one of the major operators. This, combined with his long period of service in American fields, has equipped him with a well-rounded knowledge of oil field practices under widely varying operating conditions.

Application Chart For Laminated Shims

Laminated Shim Co., Inc. has published an interesting Application Chart. This chart places in the hands of present and potential shim users a comprehensive survey of proved applications for laminated shims or shim stock.

The applications listed are arranged for easy reference. Generous illustration of installation methods adds value to the chart as a handy guide. With it, any industrialist can quickly check his shim applications, to ascertain whether or not he is taking full advantage of the use of laminated shims throughout all of his machine assemblies or servicing.

Merco-Nordstrom's Flexible Coupling Valves

A catalog describing the new Nordstrom Flexible Coupling Valves which are manufactured by the Merco Nordstrom Valve Co., subsidiary of Pittsburgh Equitable Meter Co., should prove interesting to all operators. This catalog is now available by writing to the Merco Nordstrom Valve Co., 400 N. Lexington St., Pittsburgh, Pa.

Goose necks—crooked joints on drill-pipe driving joints to which mud-circulating hose is attached.

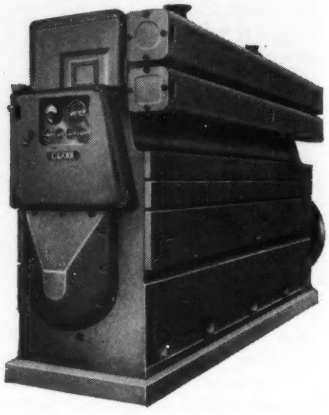
Mixing Equipment Co. Side Entering Mixers

The latest publication of the Mixing Equipment Co. is a catalog which contains much information never before published. This is the first time that such a complete amount of information has been issued in one publication on the subject of Side Entering Mixers.

Copies are available by writing to Mixing Equipment Co., Inc., 1088 Garson Ave., Rochester, N. Y.

Clark Bros. Announce New Gas-Diesel Engine

A new line of convertible 4-cycle gas and Diesel engines has been announced



by Clark Bros. Co., of Olean, New York.

These new engines are completely enclosed, have oil-cooled pistons, full force feed lubrication, and offer an entirely new feature, the Clark "Cetene Selector." By means of the "Cetene Selector," the operator can change the fuel timing without shutting down the engine, thus making possible the use of a wider range of fuels.

The engines have 10" bore x 12" stroke and are available in 3, 4, 6 and 8-cylinder sizes, ranging from 180 to 480 B.H.P. for gas and 200 to 535 B.H.P. for Diesel.

Sprayable Plastic Coatings

Description and applications of a cold applied, corrosion-proof sprayable plastic coating for concrete, metal and wood surfaces, are set out in considerable detail in a booklet recently issued by American Concrete & Steel Pipe Co., Southgate, Calif. The exclusive distributors of Amercoat Coatings are Amercoat Sales Agency, 5905 Pacific Blvd., Huntington Park, Calif.

Pipes, tanks, and pressure vessels can be welded automatically 20 times faster from commercial steels of any thickness by a new electrical method.

Allsteel Products Mfg. Co. Changes Name To Cardwell

The Allsteel Products Manufacturing Co., whose trademark has been "Cardwell Allsteel" has found it necessary to change its name to Cardwell Manufacturing Co., Inc., because of many customers and friends requesting the change due to difficulty and confusion in filing. This correction has become necessary from the prominent use of the trademark "Cardwell Allsteel" on advertising matter and literature, which caused confusion both among file clerks and others.

The Allsteel Products Manufacturing Co. has been outstandingly progressive in designing and improving drilling rigs, both rotary and cable tool. In fact, all drawworks it manufactures are available with cable tool drilling attachments; also with double drum, the upper drum being a distinct source of economy as a bailing and measuring drum, or in the operation of a wire line core barrel.

One of the outstanding pieces of equipment that has recently been placed on the market by the Allsteel Products Manufacturing Co. is their Mobilhoist, a self-propelled oil well servicing or drilling machine, on pneumatic tires, with no tire overloaded, hydraulic brakes on all four wheels, available in a single or double drum unit with or without rotary or cable tool drilling attachments and with or without servicing or drilling masts. The masts are telescoping type that may be folded up on the machine and the machine transported at a speed up to 40 miles per hour.

The Allsteel Products Manufacturing Co. has been a leader in the use of alloy steels, heat-treatment, and the building of oil field machinery along modern engineering practice. Through the use of alloys and careful stress analysis of all materials used in the equipment, surplus weight to the last pound has been eliminated, with definite care taken to see that every piece of equipment is designed with the fewest parts, with detailed attention paid to dismantling these parts in the field for repairs when necessary.

The newly named Cardwell Manufacturing Co., Inc., requests the cooperation of the trade in effecting this change in name. There is no change in the financial standing or ownership of the company.

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125 Octane Gasoline Produced Experimentally

Gasoline of 125 octane, having 50 per cent greater power output than present 100 octane gasoline is being produced experimentally in petroleum laboratories. Costing about $3,600 a gallon a year ago, the experiments have already reduced the cost 98 per cent to $50 a gallon. Continued experiments are expected to reduce the cost sufficiently to permit commercial production.

Although not essential for today's motor cars, the super-octane gasolines are a major requirement of the nation's flying defense forces. American refiners are now producing the world's only adequate supply of fighting-grade aviation gasoline—a supply which could be vastly increased in the event of national crisis.

The engines of commercial air liners constantly have been stepped up in power as supplies of high-octane aviation fuel have been made available at the refineries. A marked increase in the safety of commercial aviation has resulted. The airlines have increased their consumption of fuel 51 per cent, and government aircraft have increased their consumption 65 per cent in the last five years.

Drilling and Production, Committee Meet in L. A.

Reviewing the actions and findings of the various committees that met at the recent American Petroleum Institute mid-year meeting at New Orleans, the A.P.I. Topical Committees on Drilling and Production Practice met at the Los Angeles Athletic Club on the evening of June 13. C. W. Froome, Union Oil Co., explained the action of the engineers committee on standardization of tubular goods and F. E. Davie, Shell Co., reviewed the work of the special subcommittee on oil well cements. P. H. Jones, Union Oil Co., explained the results of the work of the subcommittee on standard field procedure for testing drilling fluids. Dr. Norris Johnston, General Petroleum Corp., reported on the meetings of the Topical Committee on Production Technology, and D. L. Caldwell, Barnsdall Oil Co., discussed plans for future work of the drilling and production committees.

Liquefied Gas Sales Expand 17 Per Cent

Despite uncertain economic conditions during 1938, sales of liquefied petroleum gases continued to gain although at a lower rate than in recent years. Domestic deliveries of liquefied petroleum gases were 165,201,000 gallons in 1938 as reported by distributors to the U. S. Bureau of Mines. The 1938 sales represent a gain of 17 per cent over the 1937 total of 141,400,000 gallons and compare with a 33 per cent increase in 1937 over 1936. All principal demands for liquefied petroleum gases were greater in 1938 than in 1937 with the exception of deliveries for industrial fuel which use declined in 1938, due to generally curtailed manufacturing operations. Sales of liquefied petroleum gases for domestic consumption expanded noticably in 1938, increasing by 42 per cent as the advantages of this type of fuel for cooking, heating, air conditioning, refrigeration, power and lighting for the home, the farm, the camp, and the small establishment became more widely known.

Tideland Oil Survey Urged in Assembly

A resolution calling for a survey to determine whether state-owned tideland oil deposits in Los Angeles County, particularly in the vicinity of Venice, are being drained illegally was introducel in the California Assembly on June 5 by Assemblyman Voigt of Los Angeles. Mr. Voigt's proposal requested the State Lands Commission to determine whether slant-drilled wells from the uplands are draining the tideland pools. Mr. Voigt's proposal followed the action of the House of Representatives Judiciary subcommittee last week in unanimously opposing the Hobbs bill to assert title to oil deposite off the California coast for the Federal Government. The proposal to claim Federal ownership of petroleum lying under the ocean below the low tide mark and to make such oil deposits a naval petroleum reserve was first made in Congress two years ago, when a resolution by Senator Nye of North Dakota passed the Senate. Extensive hearings on the Hobbs resolution were held early in this session, but the adverse committee report probably means the measure is doomed.

Hearings Delay Fair Trade Measure

Hearings on the District of Columbia fair trade bill have revealed that the Federal administration is definitely against state fair trade laws and the Miller-Tydings act. President Roosevelt sent a letter to Vice-President Garner asking that no further consideration be given this bill (H. R. 3838) until a study of such acts has been completed by the Federal Trade Commission and the Temporary National Economic Committee. In addition, two attorneys of the Justice Department, taking the place of Thurman Arnold, assistant Attorney General, who is not in Washington at present, appeared at the hearings to protest the measure. They were J. C. Wilson and Corwin Edwards.

New Combination Hook Introduced by Regan

A powerful casing hook to carry a full load of 300 tons with a large safety factor has been developed by Regan Forge & Engineering Co. It is a combination hook embodying two separate load carrying elements. The lower hook

carries the swivel bail and the upper yoke is designed to carry the elevator links. The cross-yoke is slidably mounted. When the load is applied the yoke travels downward and rests upon the main hook.

The newly engineered hook is either forged or cast of alloy steel and is fully heat-treated to develop the optimum of physical properties. To permit free swivelling, a heavy-duty anti-friction roller bearing is embodied. Provision is made for locking the hook in any one of four positions. The safety latch is ingeniously engineered to provide positive action and to preclude any possibility of the hook becoming unhooked accidentally. The overall length is 120 ins.; weight 5000 lbs. Further information may be procured from Regan Forge & Engineering Co., San Pedro, California.

Eagle Oil & Refining Building Bulk Plants

An expansion program which calls for immediate building of branch bulk storage plants in leading Southern California cities has been launched by the Eagle Oil & Refining Co., Inc., of Santa Fe Springs.

Albert F. Curtis, for fifteen years division manager of retail sales for the Shell Oil Co., has been appointed sales manager of the southern district for Eagle, according to the announcement of Harvey F. Nelson, president of Eagle Oil, who states that Eagle is arranging to introduce these new lines of gasoline at once into Long Beach, the Coast cities to San Diego and Imperial Valley.

The Eagle refinery has just been remodeled, enlarged and licensed under the Dubbs cracking process and an Ethyl treating plant has been installed. Distribution will be throughout Southern California.

Shepherd Tractor Now Sole Lycoming Agents

Shepherd Tractor & Equipment Co. has been appointed sole distributors for Lycoming natural gas engines and natural gas engine generator units for the Pacific Coast territory.

The company has first installed complete service facilities and a full stock of parts, because with them service always comes first. Then they have put in a complete line of engines and units.

Lycoming natural gas engines have been designed especially for oil field work and incorporate many exclusive mechanical and safety features. They are all equipped with electric starters. They have automatic shut-offs in case anything goes wrong. They have extra large lubricating oil capacities and are built with special integral bases.

Lycoming natural gas engines **are not converted gasoline engines,** but are built from the ground up for the purpose for which they are intended. Lycoming engines have been sold in this territory for a number of years, and the exceptional service they have given has made them very popular. They will now have the same service and parts facilities that follow "Caterpillar" tractors, which is additional assurance to the purchaser.

Mr. H. V. Snodgrass, formerly with the Lycoming Co., has joined the Shepherd organization in the sales division, and will be very glad to meet his old friends. The address is 150 West Jefferson St., Los Angeles. In the Bakersfield area, G. W. Weese, well known service engineer, will have charge of servicing the Lycoming units. Mr. Weese will operate a store for Shepherd in the area.

"Petroleum Transportation, Storage, and Marketing", the third of three charts showing fundamental operations of the petroleum industry, has been published by the American Petroleum Institute.

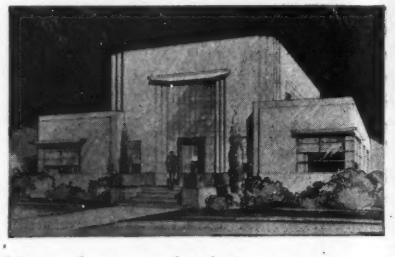
Feedwater Treatment

Three interesting booklets on water treatment have just been published by National Aluminate Corp., 6216 West 66th Place, Chicago. No. 28S describes an anti-incrustant or scale retarder for use in boilers, feedlines, heaters, pumps, injectors, regulators, diesel and oil engines, surface condensers, heat exchangers and in cooling water for various purposes. No. 31 describes a method for elimination of algae and slime in cooling systems. The third is a reprint of an article by J. A. Holmes, of NALCO, entitled "Feedwater Problems Increase With Temperature and Pressure: What Shall We Do About It?"

Vapor Recovery Systems To Large New Quarters

Rapidly expanding business has made it necessary for The Vapor Recovery Systems Company to build a new office at its present location, 2820 North Alameda St., Compton, California.

Plans were prepared by William E.



Mayer for a modernistic structure two stories high, streamlined Class A construction, with a floor space of approximately four thousand square feet. This will be divided into rather elaborate private offices, display room, reception room, large general office, engineering department for twelve engineers and an art and advertising section. Two large fireproof vaults will preserve valuable drawings and documents.

Modern equipment will include intercommunicating systems, air conditioning, addressograph, multigraph, mimeograph, and other business machines. Estimated cost of the building and equipment is $30,000. Contract has been awarded to C. W. Driver, Inc., Los Angeles, and work on the foundations was started May 24.

Straight Hole Bill Defeated in Assembly

Defeat of the O'Donnell straight hole bill (A. B. 2432) was registered by the California Assembly on June 7, The bill would have amended the Code of Civil Procedure, relating to actions for underground trespass by means of an oil or a gas well.

PRODUCTION :-: DEVELOPMENT

(Figures of Production and Stocks are in barrels of 42 Gals.)

	Total Production April	—DAILY AVERAGE— April, 1939	Mar., 1939	April, 1938
Group No. 1				
Arvin	13,694	456	163	.....
Belridge—North	346,630	11,554	11,966	15,843
Belridge—South	33,360	1,112	1,207	1,174
Canal	127,843	4,261	4,466	1,856
Canfield Ranch	1,053	35	46	138
Coalinga	334,254	11,142	10,595	13,120
Cole's Levee	8,767	292	225	.....
Edison	69,180	2,306	2,260	3,537
Elk Hills	296,762	9,892	10,123	11,120
Fruitvale	203,271	6,776	7,053	9,260
Greeley	48,621	1,621	1,791	3,304
Kern River	334,456	11,149	11,253	13,348
Kettleman Middle Dome	1,008	34	37	60
Kettleman North Dome	1,591,704	53,057	56,100	80,957
Lost Hills	99,160	3,305	3,420	3,830
McKittrick	88,194	2,940	3,899	3,803
Midway-Sunset	1,588,667	52,956	55,435	65,935
Mountain View	252,834	8,428	8,608	12,211
Mount Poso	393,680	13,123	13,273	19,420
Rio Bravo	251,963	8,398	8,145	3,123
Round Mountain	327,911	10,930	11,614	16,731
Ten Section	259,560	8,652	9,109	6,155
Tupman	15,584	519	264	.....
Wasco	21,563	719	903	389
Wheeler Ridge	9,626	321	372	314
Group No. 2				
Capitan	74,506	2,484	2,666	3,068
Elwood	127,695	4,257	4,634	6,611
Rincon	87,458	2,915	2,923	3,827
San Miguelito	72,374	2,413	2,324	2,965
Santa Barbara	8,387	280	289	442
Santa Maria	557,337	18,577	17,202	17,805
Summerland	931	31	22	29
Ventura Avenue	995,831	33,194	33,685	37,114
Ventura-Newhall	178,201	5,940	5,829	5,170
Watsonville	900	30	30	40
Group No. 3				
Brea-Olinda	166,959	5,565	5,636	5,927
Coyote—East	67,217	2,241	2,527	3,560
Coyote—West	231,352	7,712	7,970	8,998
Domingues	634,435	21,148	21,256	26,737
El Segundo	99,067	3,302	3,451	14,418
Huntington Beach	875,013	29,167	28,678	34,193
Inglewood	350,898	11,697	12,647	15,924
Lawndale	2,016	67	72	71
Long Beach	1,456,771	48,559	48,511	58,185
Los Angeles-Salt Lake	14,804	493	503	553
Montebello	464,868	15,496	15,021	8,551
Playa Del Rey	156,030	5,201	5,301	6,763
Potrero	28,623	954	879	416
Richfield	256,567	8,552	8,512	9,674
Rosecrans	406,007	13,533	15,243	6,905
Santa Fe Springs	833,717	27,791	28,317	37,298
Seal Beach	220,677	7,356	7,612	9,476
Torrance	651,628	21,721	21,892	9,607
Whittier	29,109	970	985	945
Wilmington	2,635,130	87,838	85,114	100,672
Total	18,403,853	613,462	622,058	721,581
March	19,283,785	622,058		
Decrease	879,932	8,596		

SUMMARY OF CALIFORNIA OILFIELD OPERATIONS FOR APRIL, 1939—STOCKS HELD IN PACIFIC COAST TERRITORY BY CALIFORNIA OIL COMPANIES

	April 30, 1939	March 31, 1939	April Changes	Dec. 31, 1938 (Reclassified)
1. Gasoline-Bearing Crude	39,530,900	39,215,749	+ 315,151	36,225,312
2. Non-Gasoline-Bearing Crude	15,195,794	15,808,425	− 612,631	16,282,177
3. Unblended Nat. Gas	2,201,339	2,137,837	+ 63,502	2,699,455
4. Gasoline (not including distributing and service stations)	15,400,469	15,805,417	− 404,948	13,259,369
5. Naphtha Distillates	1,407,569[1]	1,384,449[1]	+ 23,120	1,566,349[1]
6. Gas Oil and Diesel Oil	10,826,518	10,382,404	+ 444,114	10,539,937
7. Fuel Oil Residuum	70,877,903	70,551,947	+ 325,956	70,957,881
8. All Other Stocks	6,656,202[2]	6,306,740[2]	+ 349,462	6,153,809[2]
TOTAL	162,096,694	161,592,968	+ 503,726	157,684,289

	New Rigs Up	Active Drilling	Producers Completed	Daily Initial Output	Active Producing	Abandoned Wells Drillers	Abandoned Wells Producers
Group No. 1							
Arvin	1	2	1	780	2	....	....
Belridge—North	1	4	2	1,624	65	1	....
Belridge—South	..	....	....	....	88	3	....
Canal	2	2	2	3,462	21	....	....
Canfield Ranch	..	....	....	....	1	....	....
Coalinga	6	10	6	16,087	783	2	....
Cole's Levee	1	4	....	....	2	....	....
Edison	..	....	....	....	87	1	1
Elk Hills	..	....	....	....	169	....	....
Fruitvale	1	4	....	....	172	2	....
Greeley	2	5	....	....	14	1	....
Kern River	2	4	3	32	1,287	5	1
Kettleman Middle Dome	..	....	....	....	3	....	....
Kettleman North Dome	3	13	4	8,019	216	1	....
Lost Hills	1	1	....	....	245	....	....
McKittrick	..	1	1	45	199	3	....
Midway-Sunset	3	5	1	255	2,501	4	1
Mountain View	..	....	....	....	179	....	2
Mount Poso	2	5	1	380	286	3	....
Rio Bravo	..	3	1	1,690	28	....	....
Round Mountain	2	1	1	80	204	2	....
Ten Section	1	1	1	3,580	30	....	....
Tupman	..	1	1	1,592	2	....	....
Wasco	1	1	1	5,000	5	....	....
Wheeler Ridge	..	....	....	....	33	....	....
Group No. 2							
Capitan	..	1	....	....	48	....	....
Elwood	..	....	....	....	81	....	....
Rincon	3	1	1	689	54	....	....
San Miguelito	..	2	....	....	20	....	....
Santa Barbara	..	....	....	....	26	....	6
Santa Maria	1	2	1	3,380	306	....	1
Summerland	1	1	....	....	19	....	....
Ventura Avenue	..	11	2	4,448	268	....	....
Ventura-Newhall	5	13	1	1,986	551	1	1
Watsonville	..	....	....	....	7	....	....
Group No. 3							
Brea-Olinda	..	....	....	....	351	....	....
Coyote—East	2	1	....	....	85	....	....
Coyote—West	..	1	1	1,050	48	....	....
Domingues	2	4	....	....	181	....	....
El Segundo	..	....	....	....	50	....	....
Huntington Beach	3	3	2	291	552	....	1
Inglewood	..	....	....	....	206	....	....
Lawndale	..	....	....	....	6	....	....
Long Beach	..	1	....	....	1,237	....	1
Los Angeles-Salt Lake	..	....	....	....	112	....	....
Montebello	2	10	8	5,668	232	....	....
Playa Del Rey	1	1	....	....	184	....	1
Potrero	..	....	1	356	15	....	....
Richfield	..	....	....	....	297	1	....
Rosecrans	3	6	2	1,022	127	....	1
Santa Fe Springs	..	....	....	....	569	....	2
Seal Beach	..	1	....	....	101	....	1
Torrance	3	6	20	5,303	720	1	2
Whittier	..	....	....	....	151	....	....
Wilmington	27	15	13	5,144	628	....	....
Miscellaneous Drilling	6	27	....	....	....	14	....
Group No. 4—Gas Fields							
Buena Vista Lake	..	....	....	....	4	....	....
Buttonwillow	..	....	....	....	10	....	....
Chowchilla	..	....	....	....	....	....	....
Delano	1	1	....	....	....	....	....
Dudley Ridge	..	....	....	....	....	....	....
Goleta	1	1	....	....	....	....	....
Marysville Buttes	1	1	....	....	2	....	....
McDonald Island	..	....	....	....	4	....	....
Rio Vista	..	....	....	....	22	....	....
Semi-Tropic	..	....	....	....	....	....	....
Tracy	..	....	....	....	1	....	....
April	91	177	78	71,963	13,897	45	22
March	73	176	58	53,034	13,900	19	28
Increase (*Decrease)	18	1	20	18,920	12*	26	6*

[1]Estimated amount of unfinished gasoline contained in item 5 ..... 1,210,404 1,184,846 1,350,379

[2]Coke included in item 8 ..... 222,379 189,832 92,066

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MAPS

Large maps of Los Angeles Basin oil fields and map showing all California oil fields. Price $15.00 each on paper and $20 each on cloth. Individual state oil and gas maps of Mid-Continent and Rocky Mountain regions. Maps show geological cross sections at base. These maps indicate wells drilling, wells producing and abandoned, with depths.
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MAPS

New colored San Joaquin Valley map, showing oil & gas fields, also all wildcat wells, both old & new, with status June, 1939. Three-foot size, paper $7.50, cloth $9.00. 4½-foot size, $15.00. Earl M. Price & Co., Box 533, Bakersfield. 8-5-d

Oil Men's Calendar

C.N.G.A. Meeting First Thurs. Each Month.

June

25-July 1—13th International Congress of Carbide, Acetylene, Oxy-Acetylene Welding and Allied Industries, Munich, Germany.

26-30—American Society for Testing Materials, 42nd Annual Meeting, Chalfonte Haddon Hall, Atlantic City, N. J.

July

10-17—American Institute of Mining & Metallurgical Engineers, Regional Meeting, San Francisco, Calif.

October

4-6—American Institute of Mining & Metallurgical Engineers, Petroleum Division, Galveston, Tex.

9-10—American Gas Assn., Annual Convention, New York.

California Crude Oil Production

Two Weeks Ended June 10, 1939

	June Daily Quota	Average Daily Production	Excess
San Joaquin Valley			
Belridge—North	13,353	11,879	*1,474
Belridge—South	2,180	1,012	*1,168
Buena Vista	17,476	16,519	*957
Canal	5,283	4,948	*335
Coalinga-East(Eocene)	6,250	6,415	165
Coalinga—East-West	16,214	6,892	*9,322
Edison	2,160	2,290	130
Elk Hills	7,828	10,043	2,215
Fruitvale	6,232	6,790	558
Greeley	3,059	1,838	*1,221
Kern Front	7,651	6,632	*1,019
Kern River	8,389	2,495	*5,894
Kettleman No. Dome	35,297	48,550	13,253
Lost Hills	4,140	3,038	*1,102
McKittrick	3,930	3,295	*635
Midway	38,506	31,754	*6,752
Mount Poso	10,565	11,701	1,136
Mountain View	8,923	9,326	403
Rio Bravo	7,250	7,572	322
Round Mountain and Coffee Canyon	8,178	9,595	1,417
Ten Section	9,059	8,901	*158
Wasco	1,255	1,049	*206
Other Fields	3,216	3,282	66
TOTAL	226,394	215,816	*10,578
Coastal Counties			
Elwood	3,580	4,183	603
Rincon	2,584	3,907	1,323
Santa Maria	8,496	3,268	*5,228
Gato Ridge	2,450	4,740	2,290
Santa Maria Valley	21,519	10,275	*11,244
Santa Paula-Newhall	5,545	5,371	*174
Ventura Avenue	30,317	38,697	8,380
Other Fields	5,242	5,063	*179
TOTAL	79,733	75,504	*4,229
Los Angeles Basin			
Alamitos-Seal Beach	6,850	8,070	1,220
Brea-Olinda	8,369	5,725	*2,644
Coyote—East	3,062	2,289	*773
Coyote—West	10,274	8,659	*1,615
Domingues	16,108	19,912	3,804
El Segundo	3,245	3,157	*88
Huntington Beach—New and Old	22,275	27,570	5,295
Inglewood	12,655	11,915	*740
Long Beach	41,774	46,420	4,646
Montebello	6,137	6,172	35
Montebello-West End	7,022	12,534	5,512
Playa del Rey	4,861	4,984	123
Richfield	7,855	8,147	292
Rosecrans-Athens	9,972	12,447	2,475
Santa Fe Springs	25,945	27,220	1,275
Torrance	5,560	5,517	*43
Torrance "34" and "D & B"	11,331	14,143	2,812
Wilmington	75,447	85,274	9,827
Other Fields	3,332	3,766	434
TOTAL	282,074	313,921	31,847
STATE TOTAL	588,201	605,241	17,040

*—Shortage.

1850 9240